AVIATION WEEK

JULY 26, 1954

A McGRAW-HILL PUBLICATION

50 CENTS

Announcing – Honeywell's new exhaust gas temperature indicating system

A SYSTEM that will measure exhaust gas temperature of jet engines with an accuracy of plus or minus 5°C. through the engine's entire temperature range!

That's the latest jet engine development from Honeywell – the most accurate exhaust gas temperature indicating system available today. The system weighs only 3.5 pounds.

Combining new miniaturization techniques with years of experience in producing precise, reliable controls, the new Honeywell system will give accurate indication for a minimum of 1,000 hours of operation without recalibration.

In safeguarding engine life and assuring the pilot of adequate thrust, accurate temperature indication is a must. That's why this new system, four times more accurate than any other available system, should contribute greatly to more efficient and reliable jet flight.

For additional information on this new exhaust gas temperature indicating system, write to Honeywell Aeronautical Division, Dept. AW 7-149, Minneapolis 13, Minn.

MINNEAPOLIS **Honeywell**

Aeronautical Division

2600 Ridgway Road, Minneapolis 13, Minn.

E B POWER GS
UNIVERSITY MICROFILM INC
313 N 1ST ST
ANN ARBOR MICH

AS REVOLUTIONARY AS THE MATADOR...

KAYLOCK
Trade Mark
SELF-LOCKING NUTS

The Martin B-61 Matador is the first successful pilotless bomber to be approved by the U. S. Air Force. Its operational simplicity and extreme mobility are vital tactical innovations — the result of Martin Systems Engineering.

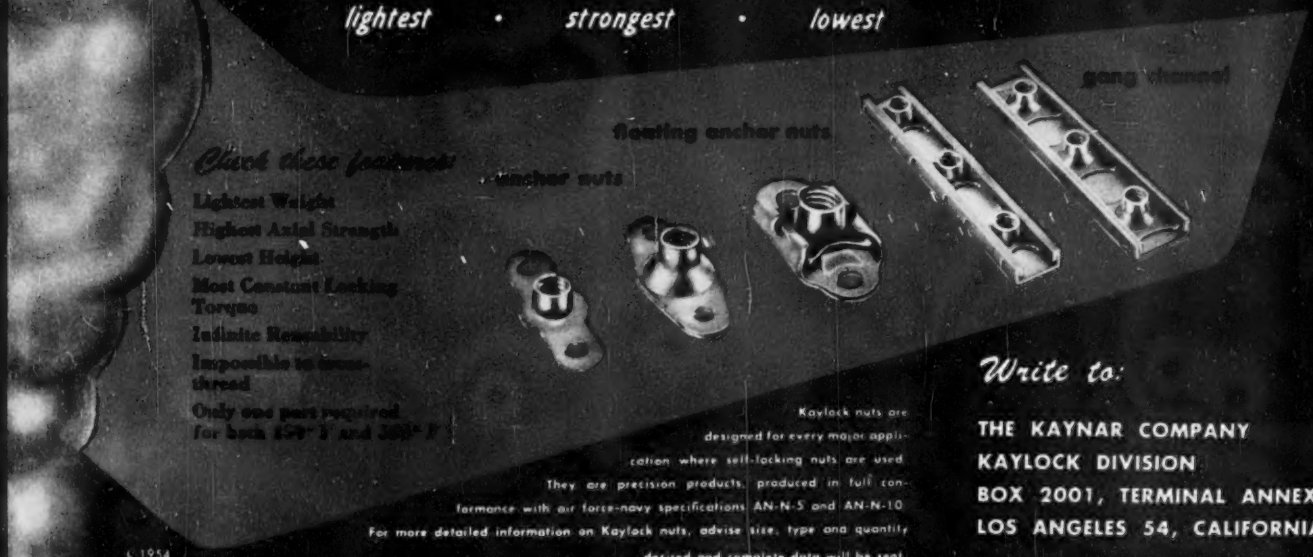
effect major advance in aircraft performance through reduction in fastener weight.

NOW—over 50% weight savings!

The Kaylock nut is lighter than any other self-locking nut of equivalent size and strength. This is due to the high-strength thinner section of metal and lower height made possible by its unique locking action.

It is estimated that Kaylock nuts save as much as 700 pounds on a typical guided missile or a fighter plane, based on the accepted weight-growth factor of ten.

lightest • strongest • lowest



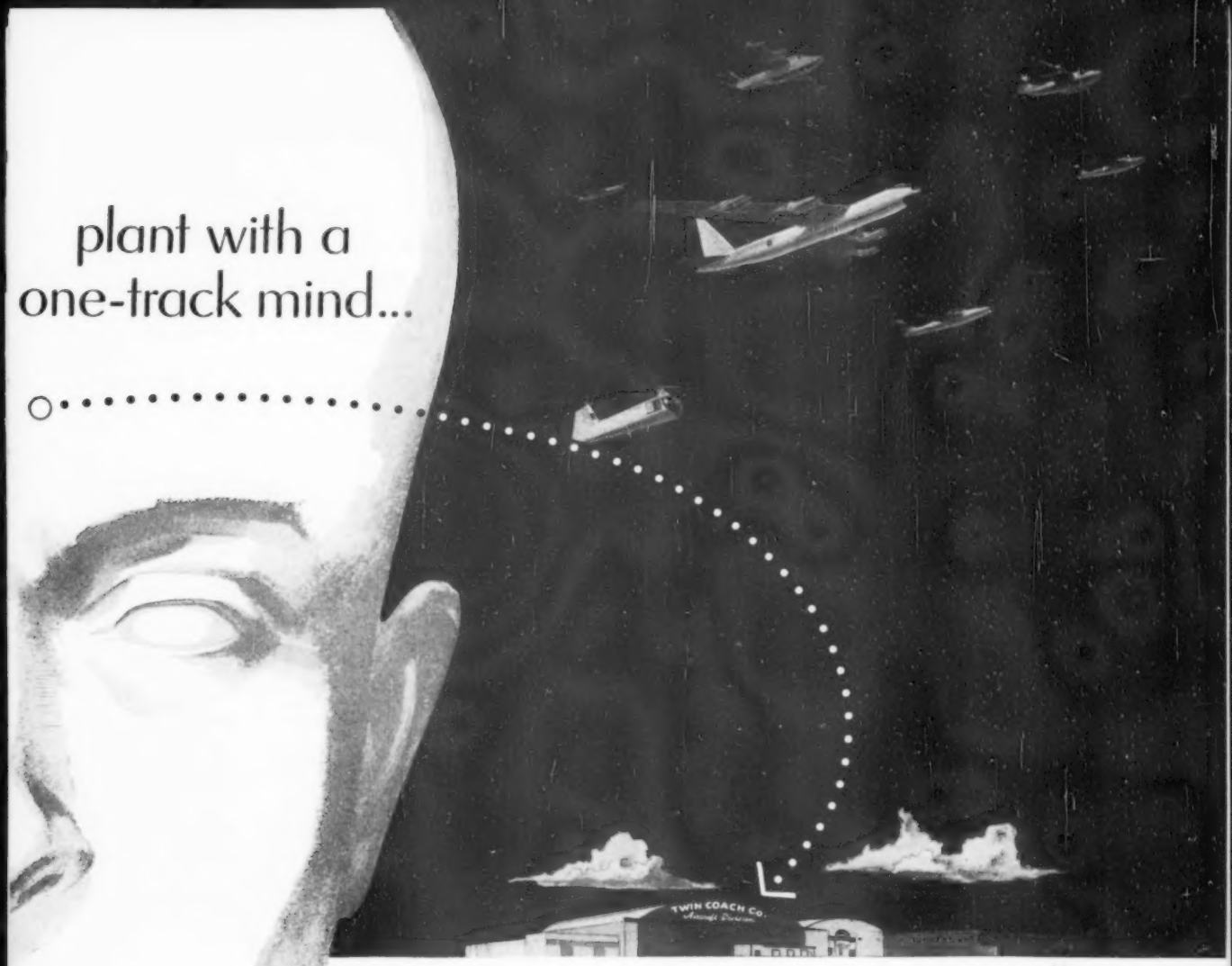
Kaylock nuts are designed for every major application where self-locking nuts are used. They are precision products, produced in full conformance with air force-navy specifications AN-N-5 and AN-N-10. For more detailed information on Kaylock nuts, advise size, type and quantity desired and complete data will be sent.

Write to:

THE KAYNAR COMPANY
KAYLOCK DIVISION
BOX 2001, TERMINAL ANNEX
LOS ANGELES 54, CALIFORNIA

© 1954

plant with a one-track mind...



Actually Twin Coach Aircraft Division is five plants—each devoted *exclusively* to aircraft production. We do no other work; we build no other products.

Here's why this is important. It means your airframe assemblies are built by experienced aircraft specialists . . . men who know no other standards than those of the aircraft industry.

So if you have an assembly you're thinking of subcontracting, call in Twin Coach Aircraft Division for consultation. You'll be secure in the knowledge that it's built by men who think like you . . . *men whose one thought is to produce to specification and on schedule.*

A-9123

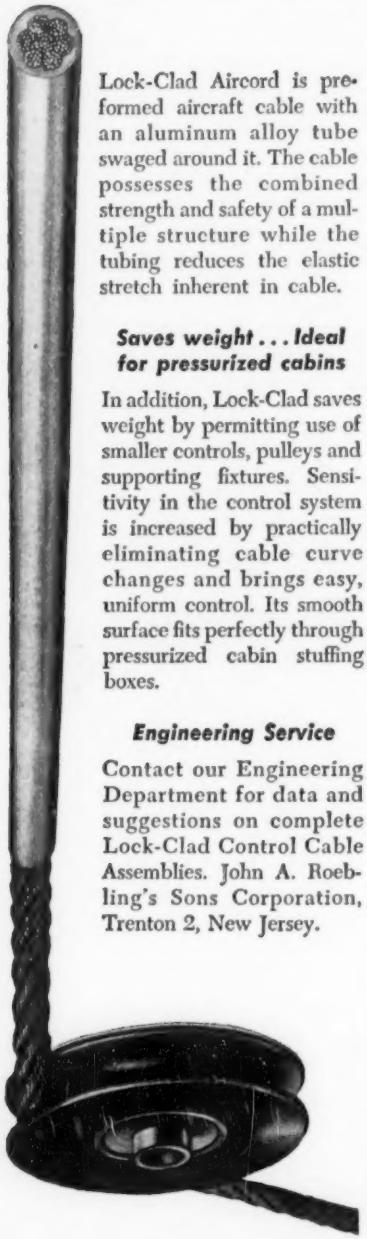
TWIN COACH COMPANY
Aircraft Division **BUFFALO, N. Y.**

FAGEOL TWIN COACH AIRCRAFT

OTHER DIVISIONS OF
TWIN COACH COMPANY MAKE:
Fageol Van Trucks, Fageol Gasoline and Propane Engines, Fageol-Leyland Diesel Engines

TWIN COACH AIRCRAFT DIVISION MAKES ASSEMBLIES FOR
GRUMMAN S2F AND UF, BOEING B-52, PIASECKI HUP, REPUBLIC F-84F, AND CLASSIFIED EXPERIMENTAL AIRCRAFT TYPES

FOR HIGHER
AE VALUES...
ROEBLING
LOCK-CLAD AIRCORD



Lock-Clad Aircord is preformed aircraft cable with an aluminum alloy tube swaged around it. The cable possesses the combined strength and safety of a multiple structure while the tubing reduces the elastic stretch inherent in cable.

Saves weight... Ideal for pressurized cabins

In addition, Lock-Clad saves weight by permitting use of smaller controls, pulleys and supporting fixtures. Sensitivity in the control system is increased by practically eliminating cable curve changes and brings easy, uniform control. Its smooth surface fits perfectly through pressurized cabin stuffing boxes.

Engineering Service

Contact our Engineering Department for data and suggestions on complete Lock-Clad Control Cable Assemblies. John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

Aviation Week

JULY 26, 1954 VOL. 61, No. 4

Editorial Offices
New York 36—330 W. 42nd St., Phone LOngacre 4-3000 (Night LO 4-3035)
Washington 4, D. C.—National Press Bldg., Phone NAtional 8-3414
Los Angeles 17—1111 Wilshire Blvd., Phone MAdison 6-4323

Table of Contents on Page 8

51,735 copies of this issue printed

Robert W. Martin, Jr. ..... *Publisher*
Robert H. Wood ..... *Editor*

Robert B. Hotz, *Executive Editor*

Albert W. Bentz ..... **News Editor**
David A. Anderton ..... **Engineering**
Irving Stone ..... **Technical**
G. L. Christian ..... **Equipment, Maintenance**
Katherine Johnsen ..... **Congress**
Philip Klass ..... **Avionics**
Claude O. Witze ..... **Military**
Richard Balentine ..... **Transport**
Frank Shea, Jr. ..... **Transport**
Erwin J. Bulban ..... **Special Assignments**
William J. Coughlin ..... **West Coast**
Bernie Lang ..... **West Coast Assistant**
Henry Lefer ..... **News Desk**
Gordon C. Conley ..... **News Desk**
G. J. McAllister ..... **Washington News Desk**
Lawrence J. Herb ..... **Art Editor**
Victoria Giaculli ..... **Editorial Makeup**
Leo T. Tarpey ..... **Printing & Production**

Merlin H. Mickel, *Administrative Assistant to the Editor*

FOREIGN NEWS BUREAUS

Atlanta 3 ..... 801 Rhodes-Haverty Bldg.
Chicago 11 ..... 520 No. Michigan Ave.
Cleveland 15 ..... 1510 Hanna Bldg.
Detroit 26 ..... 856 Penobscot Bldg.
Houston 25 ..... 1303 Prudential Bldg.
Los Angeles 17 ..... 1111 Wilshire Blvd.
San Francisco 4 ..... 68 Post St.
Washington 4 ..... 1189 National Press Bldg.

FOREIGN NEWS SERVICE

Editor ..... Joseph K. Van Denburg, Jr.
London ..... Edward W. S. Hull
Paris ..... John O. Coppock
Bonn ..... Gerald W. Schroder
Manila ..... Herbert Leopold
Mexico City ..... John Wilhelm
Sao Paulo ..... Lionel J. Holmes
Tokyo ..... Alpheus W. Jessup

Aviation Week is served by PRESS ASSOCIATION, INC., a subsidiary of Associated Press.

Research and Marketing: Mary Detwiler Smith, Mary Whitney and Jeanne Rabstejnek.

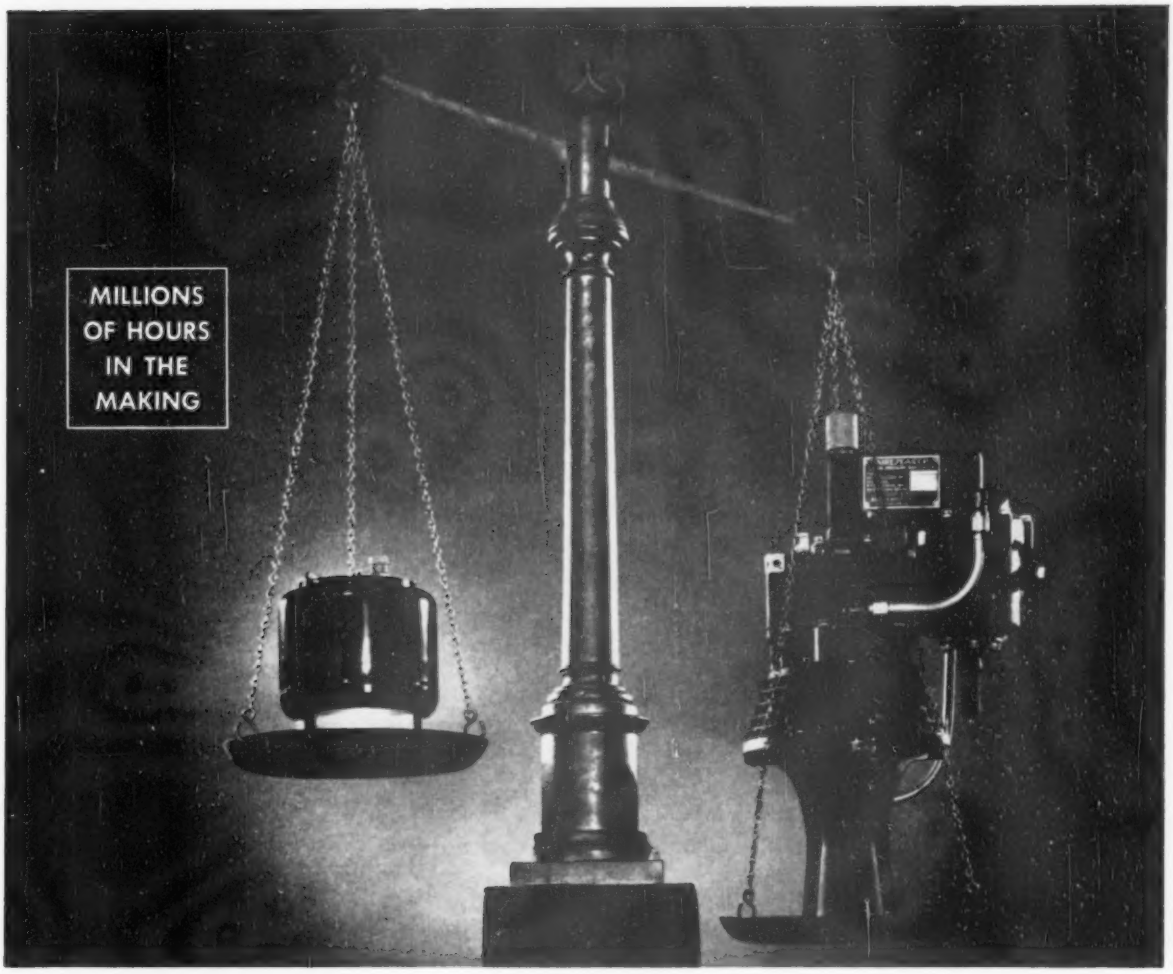
J. G. Johnson ..... *Business Manager*

T. B. Olsen, **Promotion Manager** W. V. Cockren, **Production Manager**

Sales Representatives: J. C. Anthony, **New York**; H. P. Johnson, **Cleveland**; D. T. Brennan and J. S. Costello, **Chicago** and **St. Louis**; E. P. Blanchard, Jr., **Boston**; James Cash, **Dallas**; William D. Lanier, Jr., **Atlanta**; R. E. Dorland, **San Francisco**; C. F. McReynolds and Gordon Jones, **Los Angeles**; W. S. Hessey, **Philadelphia**; C. A. Ransdell, **Detroit**. Other sales offices in **Pittsburgh**, **London**.

AVIATION WEEK • JULY 26, 1954 • Vol. 61, No. 4
Member ABP and ABC

Published weekly by McGraw-Hill Publishing Company, James H. McGraw (1860-1948), Founder. **Publication Office: 99-129 North Broadway, Albany 1, N. Y.**
Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Donald C. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Executive Vice-President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.
Subscriptions: Address correspondence to AVIATION WEEK—Subscription Service, 99-129 North Broadway, Albany 1, N. Y. or 330 W. 42nd St., New York 36, N. Y. Allow 10 days for change of address.
Subscriptions are solicited only from persons who have a commercial or professional interest in aviation. Position and company connection must be indicated on subscription orders.
Single copies 50¢. Subscription rates—United States and possessions, $6 a year; $9 for two years; $12 for three years. Canada $8 a year; $12 for two years; $16 for three years, payable in Canadian currency at par. Other Western Hemisphere and the Philippines, $10 a year; $16 for two years; $20 for three years. All other countries, $20 a year; $30 for two years; $40 for three years. Entered as second-class matter, July 16, 1947, at the Post Office at Albany, N. Y., under Act of Mar. 3, 1879. Printed in U. S. A. Copyright 1954 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved. Cable Address: "McGraw-Hill New York." Publications combined with AVIATION WEEK are AVIATION, AVIATION NEWS, AIR TRANSPORT, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights to these names are reserved by McGraw-Hill Publishing Co.



NEWEST AiRESEARCH CABIN PRESSURE REGULATOR

doubles airflow... cuts weight... reduces costs!

AiResearch, pioneer in aircraft cabin pressurization since 1939, produced all the regulators for the Boeing B-29, only pressurized World War II airplane. These units had an airflow capacity of 15 pounds and weighed 10 pounds.

Today's AiResearch cabin pressure regulator has an airflow capacity of 30 pounds and weighs only 2 pounds. It costs only one-quarter as much, yet operates with 3 times the accuracy. It has dual differential — an AiResearch first — which automatically reduces cabin pressure in combat for the protection of the pilot or crew.

Since 1939 AiResearch engineers have spent millions of hours developing and testing scores of regulator models. More than 60,000 pressure regulators have been produced for U. S. aircraft alone, along with thousands of other cabin pressure controls for both military and commercial aircraft.

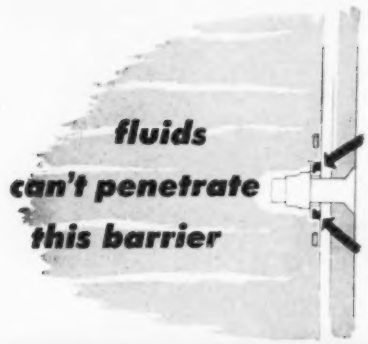
Development of the cabin pressure regulator is another example of how AiResearch achieves ever greater performance from smaller size and weight at lower cost.

AiResearch Manufacturing Company

A DIVISION OF THE GARRETT CORPORATION

LOS ANGELES 45, CALIFORNIA · PHOENIX, ARIZONA

Designer and manufacturer of aircraft equipment in these major categories



fluids can't penetrate this barrier

IN THIS SELF-SEALING DOME NUT

11 PRIME MANUFACTURERS Specify THIS NUT

for integral fuel tank sealing on aircraft in production

BOEING AIRPLANE CO.

MARTIN AIRCRAFT

DOUGLAS AIRCRAFT CO.

LOCKHEED AIRCRAFT CORP.

GRUMMAN AIRCRAFT CO.

REPUBLIC AVIATION

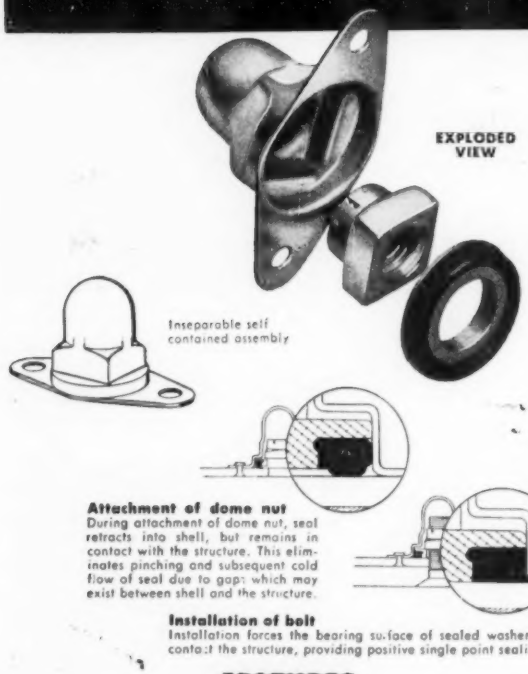
RYAN AERONAUTICAL CO.

A. V. ROE CANADA

McDONNELL Aircraft Corporation

CONVAIR AIRCRAFT

NORTH AMERICAN AVIATION



Attachment of dome nut
During attachment of dome nut, seal retracts into shell, but remains in contact with the structure. This eliminates pinching and subsequent cold flow of seal due to gaps which may exist between shell and the structure.

Installation of bolt
Installation forces the bearing surface of sealed washer to contact the structure, providing positive single point sealing.

FEATURES

- ★ High pressure sealing without sealing compounds
- ★ Inseparably self-contained assembly
- ★ Single point seal
- ★ Floating nut with stationary seal, unaffected by successive bolt installations
- ★ Reduces Installation Time Weight and Maintenance

SPECIFICATIONS

Self locking nut conforms to applicable requirements of AN-N-5. Floats .025 in all directions.

BUNA-N type seal conforms to requirements of MIL-R-6855 for aircraft fuels Type 1, 2 and 3. It is also resistant to air, salt water, oil, gasoline and most organic solvents. Temperature range: −80°F to +225°F continuous operation. Pressure range ±50 psi constant or fluctuating operation.

SILICONE type seal. Resistant to hot air, ammonia, synthetic oil. Temp. range −80°F to +450°F continuous operation.

The range of materials and sizes now available has been greatly expanded. Pick the part number that meets your specific requirements from the following chart of production types.

Thread Sizes	Steel shell & nut; aluminum washer; Buna-N seal	Steel shell, nut & washer, Silicone seal	Steel shell aluminum nut & washer; Buna-N seal	Corrosion-resistant steel shell & nut; aluminum washer; Buna-N seal
6-32 NC-2	4630H-62	4630HA-62	—	4730H-62
8-32 NC-2	4630H-82	4630HA-82	—	4730H-82
10-32 NF-3	4630H-02	4630HA-02	—	4730H-02
¼-28 NF-3	4630H-048	4630HA-048	4530H-048	4730H-048
5/16-24 NF-3	4630H-054	4630HA-054	—	—
⅜-24 NF-3	4630H-064	4630HA-064	—	—

NOTE: Any combination of shell, nut, washer and seal materials shown above can be readily assembled for your specific requirements.

Also available in special gang channel designs.

REDUCE YOUR COSTS. Our 12 years' experience with specialized fasteners can help you.

Nutt-Shel

811 Airway
Glendale 1, California
Citrus 4-4191 • CH 5-3693

Manufacturers of self locking anchor nuts and special fasteners.

NEWS DIGEST

Domestic

New jet transport to be built by Lockheed Aircraft Corp. will be in the 550-mph. class of Boeing Airplane Co.'s 707 but under present planning will be larger and heavier, well-informed sources report. Four engines are expected to be located in the aft fuselage in a stainless steel compartment, with access provided by a bomb-bay-like door. Airscoops are to be located on the sides of the fuselage behind the 40-deg.-swept wing's trailing edge. The transport is scheduled to get a tricycle landing gear, with the main wheels folding into the fuselage belly.

Eagine fire forced a Trans World Airlines' 749 Constellation to return to Washington National Airport July 20 shortly after takeoff. All 38 persons aboard escaped by slide evacuation chutes 70 sec. after the emergency landing.

Negotiations between American Airlines and Air Line Pilots Assn. failed to come up with a solution last week to the proposed strike of AA pilots, called in protest of extension of the eight-hour nonstop flight limit but prevented by National Mediation Board intervention.

Despite reports elsewhere, Glenn L. Martin Co. and Convair Division of General Dynamics Corp. do not have contracts to build nuclear-powered seaplanes. However, both companies have had paper design study contracts with Navy's Bureau of Aeronautics for more than a year.

Convair C-131B, 'flying laboratory' version of the twin-engine 340 transport, is in production at the company's San Diego plant under a new USAF contract. The plane will be used for AF research projects or assigned to firms developing special avionics devices.

Aviation dealers who specialize in purchasing surplus aircraft inventories have organized the Independent Aeronautical Dealers Assn., are holding monthly business meetings in New York's Columbia Club. IADA board chairman: Thor Solberg of Somerville, N. J.

Summers Gyroscope Co., Santa Monica, Calif., will develop military variations of its PAR lightplane autopilots under a new contract let by the Army Signal Corps. Systems to be developed: single-axis autopilot to control aircraft roll; two-axis device to check both roll and yaw.

Jacobs Copter Makes First Flight

New Jacobs 104 compound helicopter hovers a few feet off the ground during its official first flight last month near Pottstown, Pa. Initial tests will deal with its helicopter characteristics. Later the wings will be fitted for compound trials, including forward flight utilizing a pusher tail rotor. Designed and built by Jacobs Aircraft Engine Co., the 104 is powered by a 350-hp. Jacobs piston powerplant, has a gross weight of approximately 3,600 lb. and is designed for 170-mph. top speed. Rotor diameter is 36 ft., length is 26 ft. 4 in., height is 10 ft. 10 in. It seats five.

New $7-million USAF contract has been awarded Beech Aircraft Corp. for additional MD-3 and C-26 portable generators for B-47s and other AF jet aircraft.

Temco Aircraft Corp. has received a USAF contract to overhaul and modify 40 North American T-6G trainers at its Greenville, Tex., plant.

Air Force has formed a 16-man advisory group on small business to exchange views on methods of maintaining an adequate supporting structure of small concerns under current and prospective conditions.

Financial

Republic Aviation Corp., Farmingdale, N. Y., reports a net income of $4,590,544 for the first half of 1954, compared with $3,739,300 for the same period of 1953. Sales totaled $166,901,615, dropping from $188,299,571 reported for the first six months of last year. Backlog June 30: $918 million.

Beech Aircraft Corp., Wichita, has declared two 25-cent dividends, one payable July 29 and the second Aug. 11. The first represents the last of the omitted dividends, and the second is a regular payment for the quarter ended June 30.

International

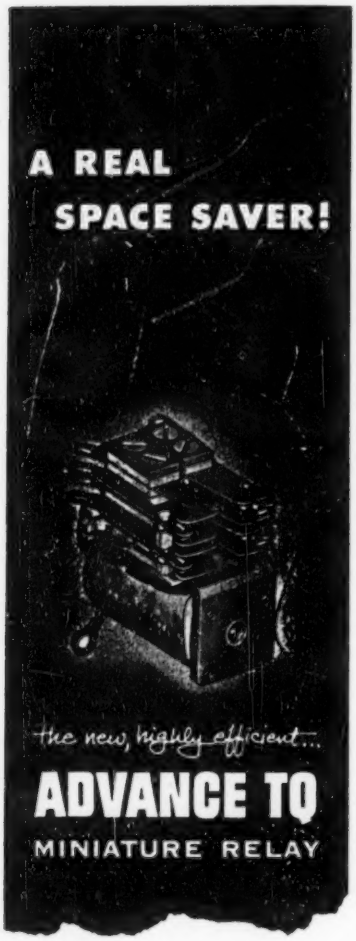
Prototype Comet 3, de Havilland Aircraft Co.'s new 500-mph., long-range jet transport, made its first flight last week at Hatfield Aerodome near Hertfordshire, England. Says test pilot John Cunningham of the 1-hr. 25-min. test: "She behaved perfectly. Everything worked."

British Overseas Airways Corp. and its partner on the London-Sydney 'Kangaroo' route, Qantas Empire Airways, are quarrelling over two vs. three-man pilot crews and similar safety standards. Angry Australian sources claim BOAC wants Qantas to eliminate one pilot because of safety record jealousy.

Mach 1 speeds have been reached by the second prototype of France's Sncase S.E. 5000, lightweight tactical fighter, during test flights.

India's air force is interested in buying 50 Australian-built Sabre Mk. 30s from Commonwealth Aircraft Corp. But reports from Melbourne say the company is unable to accept the order, still has some years of Sabre production for RAAF.

Canadian Pacific Airlines has sold its two Douglas DC-6A cargo planes, one to Northwest Orient Airlines and the other to France's Aigle Azur.



Only .94 cu. inches in size—yet it carries 3-amp. loads in the 4PDT combination. It's available up to 6PDT, and with class "H" insulation.

It's extra efficient, too, having only one air gap in the magnetic assembly. By spring-holding the armature rigidly in place, and using cross-bar contacts, all alignment problems are eliminated. Insulation is inorganic, hence there is no gassing or bubbling.

The ADVANCE TQ telephone type operates on 90 milliwatts or less. Withstands 10G vibration (10 to 55 CPS). Ambient temperature range: −55°C to +125°C. Life expectancy: 1,000,000 cycles with cross-bar contacts. Open and hermetically sealed types. Write for details.

ADVANCE RELAYS

ADVANCE ELECTRIC AND RELAY CO.

2435-A NORTH NAOMI STREET
BURBANK, CALIFORNIA

The Aviation Week

July 26, 1954

Headline News

AF to Increase New Aircraft Orders... 10
Committee OKs AF Building Projects.. 13
Boeing 707 Starts Flight Tests..... 14
Victor Crash 16
Hughes New Top Management Staffs... 16
PAA Buys 15 DC-7Cs..... 17
House Votes $22-Million Airport Aid.. 17
Slick Anti-Trust Suit Gets Hearing..... 18
BOAC to Buy U.S. Stratocruisers..... 19
Feeder Outlook 19
Piasecki Fixes H-21 Blades..... 19
PAA Asks New Rates for Air Securities 20
Battle Report From Indo-China..... 24

•

Aeronautical Engineering

NACA Tests Promise Safer Seats..... 30
Shock Tube Used as Windtunnel..... 37
Sky Compass for Polar Navigation..... 37
Hiller Erects Jet Noise Barrier..... 38

•

Avionics

New Transceiver Ideas Pay Off..... 44

•

Equipment

Flying Showcase Sells Bendix Line.... 50
Trailer Has Expandable Walls..... 52

•

Production

Wright Uses X-Ray for Alloy Studies... 55
Welding Saves Cracked Cutters..... 56

•

Air Transport

CAL-Pioneer Merger OK Expected... . 76
U. S. Airliners Battle Viscounts..... 79
U. S. Studies Middle East Airlines.... 80
Airline Policies Must Lure Investor.... 80
26-Cent Mail Rate..... 81

•

Editorial

Wipe Out the Blind Spots!..... 86

•

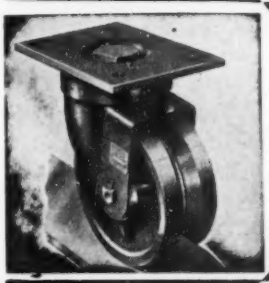
Departments

News Digest 7
Who's Where 9
Industry Observer 9
Thrust and Drag..... 39
New Patents 42
Avionic Literature 48
Filter Center 49
Off the Line 52
USAF Contracts 57
Overseas Spotlight 58
New Aviation Products..... 62
Also on the Market..... 64
What's New 67
CAB Orders 82
Shortlines 83
News Sidelights 84
Aviation Calendar 84

Picture Credits

7—Howard Levy; 14-15—Boeing; 18—Sovfoto; 20—Aero Design; 30—NACA; 37—MIT; 44—Wright Air Development Center; 50-51—Bendix Aviation; 55— Curtiss-Wright; 56—Temco; 67—Warner Bros.; 79—UAL.

DARNELL
GROOVED-WHEEL
CASTERS
made especially for
the aviation industry



These Darnell designed grooved-wheel casters, made in both swivel and stationary types, mean...

- **Stepped-up production.**
- **More efficient use of floor space.**
- **Easier handling of heavy loads.**
- **More economical movement of materials.**
- **Elimination of damage to equipment and floors.**

Contact your nearest Darnell Distributor for engineering data

Write for Free Darnell Manual

Information about other Darnell Casters used in the aviation industry will be found in this 192 page manual describing over 4000 types of casters and wheels. Send for your copy. It should be in your files.

DARNELL CORPORATION, LTD.
DOWNEY (LOS ANGELES COUNTY) CALIFORNIA
60 WALKER STREET, NEW YORK 13, NEW YORK
36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

WHO'S WHERE

In the Front Office

W. J. Matthews, former chief of administration and legal services for Canada's Department of Transport, is new chairman of the Air Transport Board.

Dr. Carl A. Frische has been promoted by Sperry Gyroscope Co., Great Neck, N. Y., to vice president-operations, taking charge of the Engineering and Manufacturing Divisions. **E. U. DaParma** has moved up to vice president for special plans and coordination.

Gerow F. Miles has been elected vice president-sales for American Shippers, Inc., New York airfreight forwarder.

Air Vice Marshal A. L. James will join Bristol Aeroplane Co. of Canada, Ltd., Sept. 1 as a member of the board and as vice president-engineering of its subsidiary, Bristol Aero Engines, Ltd. **Peter King,** former press officer for the Society of British Aircraft Constructors, is new public relations officer for Bristol in England.

Henry Salvatori, president of Western Geophysical Co. of America, has become a director of Consolidated Engineering Corp., Pasadena, Calif.

Changes

Dr. Winfield W. Salisbury has taken charge of Remler Co.'s new Gray Scientific Division, San Francisco.

George Saum has been appointed manager of the Aircraft Products Division of Taylor Forge & Pipe Works, Chicago.

Homer J. Merchant has been named assistant general manager of sales for United Air Lines.

John W. Larson, chief design engineer on Convair's B-36 project, has joined Chance Vought Aircraft, Inc., Dallas, as staff assistant to the chief engineer.

E. J. Minser has been appointed operations director for Trans World Airlines' central region.

Sy Gottlieb, former staff attorney for Bell Aircraft Corp.'s Helicopter Division, has become executive assistant and contract administrator for Zenith Plastics Co.'s Aircraft Division, Gardena, Calif.

J. W. Baird has been elected assistant secretary of Pacific Airmotive Corp., Burbank, Calif.

Robert L. Wehrli has been appointed director of research and development of the Anaheim Division of Robertshaw-Fulton Controls Co., New York.

L. Byron Post, brother of the late Wiley Post, has become superintendent of production and service for Dallas Aero Service, Dallas.

Honors and Elections

Gen. Robert J. Smith, president of Pioneer Air Lines, has been appointed by the Department of Defense to its subcommittee on special personnel problems.

Allan Bonnalie, flight training director for United Air Lines, is new chairman of an aviation consultant group set up to advise the government's Foreign Operations Administration.

INDUSTRY OBSERVER

► Don't be surprised if a major airline makes a deal with Boeing to fly its Model 707 jet transport on a regularly scheduled transcontinental freight operation. Purpose would be to gain a maximum amount of airline operational experience with the jet transport as soon as possible. Boeing had this in mind and provided for it with large cargo doors in the prototype.

► **Five airframe manufacturers are working on USAF design studies for a military jet tanker (Aviation Week July 5, p. 11). They are Douglas, Lockheed, Convair, Fairchild and Boeing. Results of these studies are due soon.**

► Sperry Gyroscope Co. has developed a new high-power Klystron tube capable of generating millions of watts of radar power that will extend the range of radar and missile guidance systems. The new tube also is aimed at much better frequency stability than previously used magnetrons, permitting greater radar receiver sensitivity and improved operation of moving target indicators.

► **Boeing experimental turboprop version of the B-47 is mothballed while awaiting delivery of the Wright T49 turboprops scheduled to power it. Boeing also is working on a version of the C-97 Stratofreighter powered by P&W T34 turboprops.**

► Indication of Convair's progress on the B-58 supersonic bomber project is the recent shift of Kermit A. Day from head of the San Antonio AMA-SAC B-36 maintenance and modernization program to the newly created job of B-58 assembly manager.

► **Convair's two YC-131C turboprop-powered Convair 340s will go to USAF Flight Test Center at Edwards AFB for Phase 2 flight testing and then to Military Air Transport Service for a rugged shakedown in regular operational transport service.**

► Increasing number of foreign governments are taking advantage of the reimbursable-aid privilege to buy American-built military aircraft at the same prices for which they are sold to USAF. Canada is the leading customer for this type of aircraft sales.

► **Order grounding two wings of Strategic Air Command Republic F-84Fs (Aviation Week July 19, p. 10) has been canceled.**

► Air Materiel Command has approved a program to retrofit all Fairchild C-119s with a co-rotational nose-wheel installation aimed at eliminating nose-wheel shimmy and current maintenance problems.

► **Navy Bureau of Aeronautics has ordered these fixes in the Westinghouse J40 as a result of the McDonnell F3H-1N grounding (Aviation Week July 19, p. 10): cleanup of fuel oil lines, fixes on line seal leakage and a general cleanup of all plumbing; stricter turbine blade inspection; fix in compressor compartment to obtain a better stall margin in the blades.**

► Lockheed already has tested its vertical-takeoff fighter in the crucial transition stages between vertical and horizontal flight. Although the plane is not equipped yet with an engine designed for vertical operation, the company has been taking advantage of the aircraft's auxiliary landing gear to conduct flight tests with conventional landings and takeoffs. While Convair, in its Moffett Field tethering rig, made the first vertical takeoffs and landings, Lockheed thus made first tests of transition performance. The aircraft could not be flown in the vertical position for more than a short period due to the type of engine, but a company source reports it handled smoothly during the vertical-horizontal operations.

► **Douglas A2D turboprop Skyshark is undergoing extensive propeller, engine and airframe changes. Much of the data on which these changes are based was obtained during the well-instrumented accident at Edwards AFB when a Skyshark made an emergency landing with its front end looking like an exploded cigar.**

AVIATION WEEK

VOL. 61, NO. 4

JULY 26, 1954

AF to Increase New Orders for Aircraft

- **$1 billion to be obligated within next four months.**
- **Big chunk to go for new NAA F-100 contracts.**

By G. J. McAllister

Air Force will accelerate its obligation rate sharply during the first four months of fiscal 1955 after reporting only $1.7 billion net obligations in fiscal 1954.

This will be reflected in the aircraft industry by an increase in the number of firm contracts for aircraft purchases previously planned by USAF.

Roger Lewis, Assistant Air Force Secretary for Materiel, says:

- $1 billion from funds for 1954 and prior years will be obligated in the next four months, "a big chunk" of it for North American F-100s. Approximately 75% of fiscal 1954 procurement funds will be obligated by October. Fiscal 1953 procurement funds are currently more than 90% obligated. A total of $6.2 billion was available for 1954.
- About 25% of the total carryover into fiscal 1955 of $4.49 billion was not obligated because of what Lewis terms "bona fide delays" in the program—requirements under review (13.5%) and late validation of requirements (10.5%).
- Gross obligations for 1954 were $3.7 billion, but $2 billion was canceled.

Major reason for non-obligation in fiscal 1954, Lewis says, was USAF's "forward purchasing policy" (AVIATION WEEK Feb. 15, p 13), the reduced lead time on re-orders of planes already in production that accounted for 37% of the funds not obligated. This is "simply the policy of not placing an order before it was necessary to place an order," he says.

▶ **Increased Flexibility**—"We didn't make these re-order periods ourselves," Lewis reports. "We wrote to the manufacturers and got back from each of them for each model what they thought the re-order time should be and we placed orders on that basis," Lewis told a news conference.

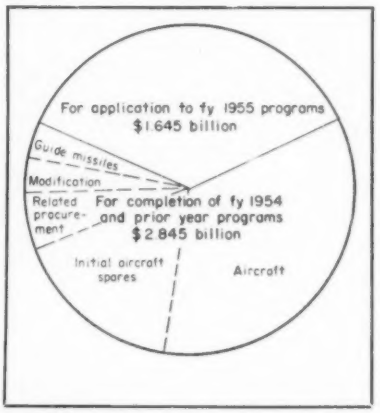
"The adoption of a policy of timing the placement of orders to the re-order lead requirements stated by the manufacturers has made it possible to defer the actual obligation in a number of cases. This has the effect of putting our orders on a more current basis, giving us more flexibility to accept engineering changes and a greater ability to schedule our buying throughout the year.

"Production slippages reflected on new schedules have made it possible to defer some follow-on orders. This has encouraged better performance on the part of manufacturers."

Re-order lead time on aircraft, Lewis reports, has been reduced from 21 to 18 months.

▶ **Spares Policy**—Another reason, accounting for 26.5% of the non-obligations in fiscal 1954, was "definitization of spares"—the process of determining precise spare requirements.

ESTIMATED UNOBLIGATED carryover in aircraft and related procurement appropriation from fiscal 1954.



DISTRIBUTION of $4.490-billion unobligated carryover into fiscal 1955 for aircraft and related procurement.

ROGER LEWIS: Order when necessary.

"These are the spares that you order concurrently with the original airplane, and not the one-year money spares," Lewis explains. "Back in the days when we sort of panicked . . . we got into a practice—and it was a good practice—of telling (manufacturers), 'Look, you're going to get so much money for spares and when you find out exactly what you need and can place it, let us know and we'll go ahead. . . .'

"When we looked at this spares business last year we found that we had spares going back a couple of years and there was no excuse for them not being definitized. So we said: 'If you can't show you need this money, if you haven't got your old orders cleaned up, before we give any big commitments we're going to hold up the money and insist on a cleanup of old spares orders.'

"That has been done and this money is now in the process of being released. . . . On our new contracts we let a certain percentage go for the long-range materiel program. We protected the current delivery element, but we did make them clean up the old business."

▶ **Cancelations**—Contracts negotiated but not signed accounted for the 12.6% balance of non-obligated funds in 1954.

Discussing the cancelation of $2 billion in obligations, Lewis says 40% of the cut came in engines, principally General Electric's J47 (AVIATION WEEK Sept. 28, 1953, p. 14).

Other items involved in the cancelation program were termination of the Beech T-36 program, a substantial reduction in the size of the heavy press

HAMILTON STANDARD . . . leader for years in propeller design and production, is supplying other equipment for such outstanding new jet aircraft as the Air Force's Convair F-102, interceptor-fighter.

Wherever Man Flies

HAMILTON STANDARD

Propellers • Starters • Air Conditioning • Fuel Controls • Pneumatic Valves • Hydraulic Pumps

HAMILTON STANDARD, WINDSOR LOCKS, CONNECTICUT

NO LEAKAGE VALVE

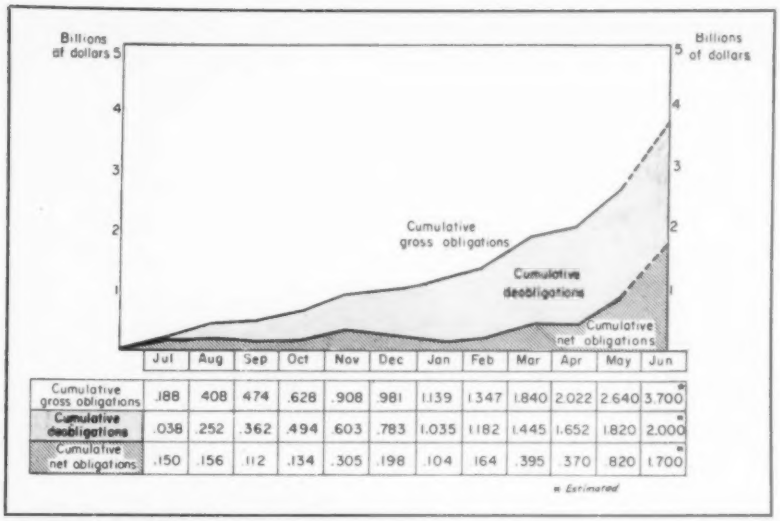
3 way 2 position normally closed
OPERATING PRESSURE 0 TO 3000 PSIG
current drain 1 amp. at 24 VDC max.
continuous duty
weight 1.1 lbs.
-65°F to 160°F ambient temperature
leakage 5 cubic inch per hour max.

ENGINEERED AND MANUFACTURED BY

com • air

PRODUCTS INC.

1201 Rio Vista • Los Angeles 23, California



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Cumulative gross obligations	.188	.408	.474	.628	.908	.981	1.139	1.347	1.840	2.022	2.640	3.700*
Cumulative deobligations	.038	.252	.362	.494	.603	.783	1.035	1.182	1.445	1.652	1.820	2.000*
Cumulative net obligations	.150	.156	.112	.134	.305	.198	.104	.164	.395	.370	.820	1.700*

* Estimated

CUMULATIVE OBLIGATIONS during fiscal 1954 for aircraft and related procurement.

program and cancelation of contracts for 151 Boeing B-47s.

▶**Sounder Practices**—"The slower rate of obligations reflected by this total obligation picture as of the end of the fiscal year is, in general, the result of our efforts through the year to return to sounder procurement practices, both in our methods of contracting and the timing of our order placements," Lewis says.

"The tightening of procedures was accomplished while our buying operations proceeded according to plan. Throughout the year commitments to contractors were made in a manner and at a time that has insured the continuation of production to fulfill the requirements of the 137-wing Air Force and to put into production the new equipment necessary to keep the Air Force modern."

Emphasis has been placed on an effort to write firm contracts and to discourage the use of letters of intent, the Assistant Secretary says. "An effort was also made to get previous contracts in order before new contracts were issued for the same item. The result has been that while such an obligation takes a little longer to complete, it is in a far more satisfactory form both to the Air Force and to the contractor."

▶**Peak Receipts**—Lewis says the aircraft industry has not suffered any layoffs because of the obligation rate of follow-on orders.

"There is gradually being felt a slight shrinkage, particularly in the subcontractor level, as a result of the planned taper-down over the next two years of the aircraft program," he reports. "We are now receiving airplanes at about our peak rate and we will do that as our 137-wing inventory fills up. But at some time—and we think it's about two and a half years from now—that inventory rate will have to shrink to a modernization rate, the rate necessary to improve the quality of the Air Force inventory as new planes can be developed.

"The sustaining rate looks to us as if it's going to be about half of the inventory rate."

Lewis points out that the question of the inventory modernization rate is out of the hands of procurement personnel. "It's a technical and scientific capability problem," he says.

Unobligated funds carried over into fiscal 1955 will be used as follows:

- For application to fiscal 1955 programs, $1.645 billion.
- For completion of fiscal 1954 and prior year programs, $2.845 billion.

Lewis says carryover funds of $1.645 billion reduced the need for new appropriations by at least that amount. Congress recently appropriated $2.76 billion for aircraft and related procurement for fiscal 1955, the amount requested by USAF (AVIATION WEEK July 5, p. 16).

He says the $1.645-billion carryover will not affect the fiscal 1956 appropriation request since all of it will be used within fiscal 1955.

Committee Approves AF Building Projects

The $834-million Air Force construction program approved by House Appropriations Committee for fiscal 1955 provides for the Air Force Academy, new strategic and tactical air bases and more than $75 million for expansion of two of USAF's major research and development centers—Arnold Engineering Development Center, Tenn., and Edwards AFB, Calif.

The program is $111 million less than USAF's request of $945 million. The committee provided only $484 million in new money, stating that the balance of the program could be financed from the $1.2 billion in unobligated funds USAF has on hand.

▶**Air Academy Cut**—The fiscal 1955 construction programs approved for Army and Navy were only fractions of USAF's program: Army, $191 million; Navy, $196 million.

The two largest items in the military construction program are $54.3 million for USAF's aircraft control and warning system and $65 million for Army's continental tactical defense system, primarily Nike sites.

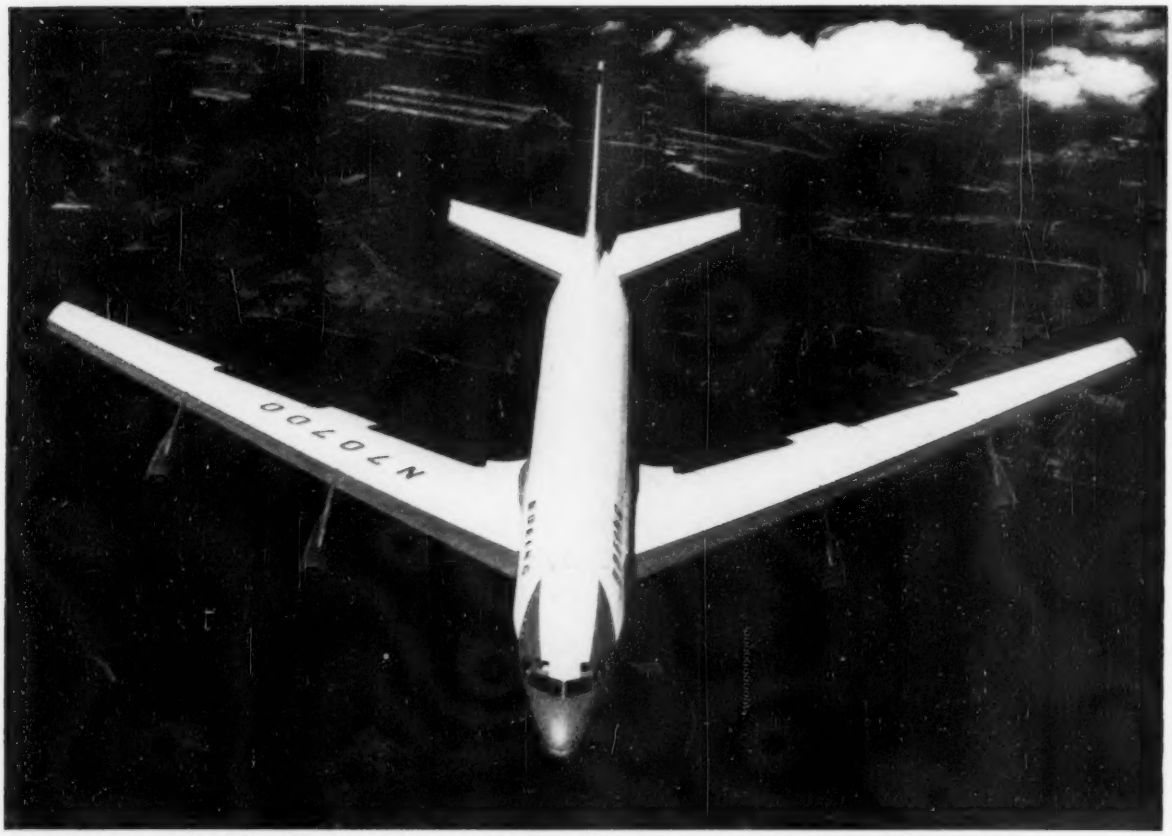
The committee voted $15.3 million for launching construction of the USAF Academy, substantially less than the $26 million USAF requested.

▶**AFB Money**—New bases provided for are:

- Clinton-Sherman Airport, Okla., Strategic Air Command, $11.4 million. Total cost will be $35.2 million.
- Myrtle Beach Municipal Airport, S. C., Tactical Air Command, $11.6 million. Total cost: $23.8 million.
- Seymour Johnson AFB, N. C., Tactical Air Command, $13.4 million. Total cost: $37.8 million.
- Beaufort, S. C., Marine Air Station, for headquarters for the Third Air Wing, $11.1 million. Total cost: $52.1 million. Headquarters for other two Marine Corps wings are at El Toro, Calif., and Cherry Point, N. C.

▶**$10-Million Projects**—Other major USAF projects, for which more than $10 million is provided:

- Arnold Engineering Development Center, Air Reesarch and Development Command, $48.7 million. Of the $275-million total estimated cost, $179 million already has been appropriated.
- Edwards AFB, ARDC, $26.7 million. Of the $118 million total estimated cost, $56 million already has been appropriated.
- Robins AFB, Ga., Air Materiel Command, $14.6 million for runways and facilities to accommodate large aircraft—B-36s, B-52s, and C-124s.
- Abilene AFB, Texas., SAC, $17.4 million for facilities to accommodate an additional wing under the 137-wing program.
- Altus AFB, Okla., SAC, $15.7 million.
- Homestead AFB, Fla., SAC, $13.2 million.
- Limestone AFB, Me., SAC, $13.5 million.
- Little Rock AFB, Ark., SAC, $11.9 million.
- Lockbourne AFB, Ohio, SAC, $10.6 million.
- Plattsburg AFB, N. Y., SAC, $16.8 million.
- Portsmouth AFB, N. H., SAC, $13.6 million.



WING FLAPS IN LANDING POSITION, brightly painted Boeing 707 jet transport heads south for Boeing Field, Seattle.

FIRST U. S. JET TRANSPORT LANDS at Seattle where company is putting it through an intensive flight test program.

Boeing 707 Starts Flight Test Program

By David Anderton

Seattle—Boeing Airplane Co.'s big 707 jet tanker-transport prototype climbed steeply off the runway at Renton Airport in a dramatic start of its first flight July 15.

One hour and 24 minutes later, pilot A. M. (Tex) Johnston and co-pilot R. L. (Dix) Loesch brought the yellow-and-brown craft in for a routine landing at nearby Boeing Field before a crowd of employes headed by president William M. Allen.

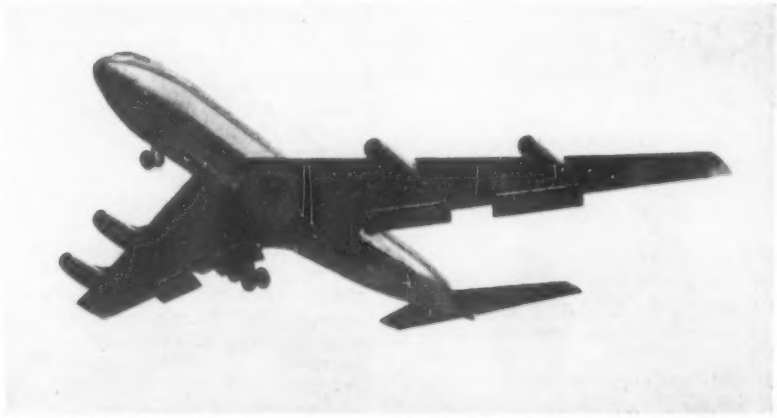
Johnston's comments: ". . . beautiful flight . . . beautiful airplane . . . handling characteristics are very good."

► **27,000 Ft.**—Two days later, the tanker-transport took off on its second test flight, staying aloft for two hours and 19 minutes and reaching an altitude of 27,000 ft.

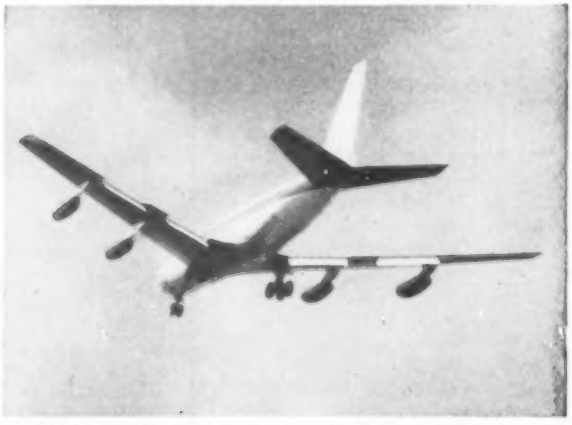
On the third flight July 19, the plane reached "operational speeds and altitudes" during a check of emergency procedures that lasted two hours 19 minutes. Emergency procedures also

1. **AIRBORNE** after using less than 2,100 ft. of Renton's 5,400-ft. runway, Boeing 707 starts to gain altitude quickly.

New Boeing Jet Climbs Fast On First Takeoff



2. **STEEP CLIMB** is aided by power of four 10,000-lb.-thrust P&WA JT3-Ls (J57s).



3. **LEAVING RENTON** after its first takeoff, 707 prototype gets up to 700-ft. altitude as it passes the end of the runway.

were checked on the fourth flight July 20 of one hour 49 minutes.

► **Delayed Flight**—Originally scheduled for early morning, the 707's first flight was delayed until the afternoon by a heavy mist and low overcast.

By 1:30 p.m., the big plane had been parked along the runway for preflight check and servicing. Johnston and Loesch arrived; just before they climbed into the lower fuselage door, Allen wished them luck.

"You haven't a thing to worry about, Bill," said Johnston. And apparently he did not, because the flight was uneventful.

Allen—along with every other Boeing official—was delighted with the informal comments during the flight.

► **17-Sec. Takeoff**—Preflight cockpit check, engine starting and taxiing out took about 10 minutes; the 707 lifted off the runway at 2:14 p.m., after a 17-sec. takeoff run that used less than 2,100 ft. of the runway. There was about 700 ft. under the plane as it passed over the end of the 5,400-ft. flight strip.

First reaction from the crew came shortly after the start of climb. "Every-

thing's real clean and steady," reported co-pilot Loesch.

First detailed report to the ground was made by Johnston: "We've been climbing to approximately 8,700 ft.; airspeed is 145 to 150 knots (167-173 mph.) All engines are operating normally, hydraulic pressures are okay. . . . It feels comparatively good."

Johnston later reported slight stick shake and attributed it to either landing gear or flap buffet; later inflight observation showed that there was some vibration of the skin on the outboard flap.

▶**Peak Altitude**—Fifteen minutes after takeoff the plane reached 20,000 ft. peak altitude for the flight.

Final approach to Boeing Field was made from the north, with the plane coming in flat and under power. The 707 touched down near the start of the runway, bounced a little and rolled to a stop.

Gross weight for the flight was about 110,000 lb., well below the plane's normal gross of 190,000 lb.

The Boeing jet prototype has a wingspan of 130 ft. and a length of 128 ft. Powerplants are four P&WA JT3-L turbo-jets (commercial J57s) rated at more than 10,000 lb. thrust each.

707 Eye Appeal

SEATTLE—The color scheme of the Boeing 707 jet transport—yellow, brown and silver—adds considerably to its eye appeal. Its performance—even for a lightly loaded prototype—was amazing at takeoff: It leaped into the air long before we expected it to be airborne, was much higher at the end of the runway than the original 100-ft. estimate given us by a Boeing flight test engineer.

The fact that inflight pictures show wheels and flaps down does not mean they never were up: The photo plane and the 707 lost radio contact and the picture takers couldn't request Tex Johnston to pose for them.

Second flight was made late in the afternoon July 17, and Tex retracted the gear soon as he was airborne. The 707 swung into a tight turn and climb. An F-86 near it had a tough time keeping up with the big transport. Some performance!

There still are no 707 orders.

The July 15 first flight date was the 38th anniversary of signing of articles of incorporation of Pacific Aero Products Co., which later became Boeing. Filing date of incorporation, however, was July 22.

Project engineer Maynard Pennell was in Washington at the time of first flight and did not get to see the 707 fly. —DAA

Victor Crash

- **Horizontal stabilizer rips off RAF bomber in flight.**
- **Accident raises doubts on high-placed tailplane.**

(McGraw-Hill World News)

LONDON

Crash of the Handley-Page Victor crescent-wing bomber (AVIATION WEEK July 19, p. 7) has raised serious doubts here about the practicability of horizontal tail surfaces located high on the vertical stabilizer—right on top in the case of the Victor.

The Victor crashed under conditions similar to those that ended the short life of its smaller experimental predecessor, the H.P. 88.

▶**Tail Wobble**—The Victor, one of two heavy bomber designs on order for the Royal Air Force with "super-priority" production ratings (other is the Avro Vulcan), was making low-altitude speed calibration runs. It had completed two and was coming over for the third when this series of events proved fatal:

There was a slight unplanned "interruption of control" and the plane nosed down slightly. It recovered. The tail began wobbling, then ripped completely loose. The Victor held steady for a fraction of a second, then dived into the ground.

Indications are that some kind of sympathetic vibration (resonance) occurred which proved too much for the Victor structure. The Gloster Javelin experienced similar troubles with its high tail.

The Victor's tail structure was supposed to have been strengthened after the H.P. 88 (modified Supermarine Attacker) worked itself into small bits.

Observers say the Victor was less than 100 ft. above the field, traveling at about 400 mph. when its tailplane came off.

▶**Terrific Force**—This brings up considerations of the terrific force that must be imposed at high speeds by such a highly placed horizontal stabilizer. The drag on this surface is great even when fixed firmly to the fuselage. However, when the tailplane is located on the vertical fin, a simple force becomes a moment with leverage that increases rapidly the higher the surface is placed.

The condemning circumstance in the case of the Victor is that the disaster occurred in straight and level flight under relatively calm conditions.

Supporters of slung pod engines are re-airing their views as a result of this latest British aviation disaster. Idea of the high-mounted tail was to keep it well clear of the jet stream of the buried engines as well as from the wing wake.

▶**Bomber Program**—The crashed plane was the only one of its kind, although a second prototype is due to fly this fall at Farnborough.

While the Victor crash may give the Avro Vulcan an edge for heavy bomber production, the main point stressed here is that Britain will have to rely on the smaller Vickers Valiant bomber for some time.

The Valiant will be the first in squadron service. It was designed in 1948 as an interim plane until the Victor and Vulcan, designed in 1946, were ready. The Valiant may well end up carrying bulk responsibility for that class in Britain's air forces.

Hughes Reveals Top Management Staffs

Los Angeles—Hughes Aircraft Co. has revealed its management staff for the first time since the shakeup last October in which a number of top officials left the company.

Hughes' office says the company still is looking for a top-ranking industrialist to replace William C. Jordan, who resigned as executive vice president-general manager last month (AVIATION WEEK June 28, p. 14).

▶**Management Link**—The list also discloses for the first time a management relationship between Hughes Aircraft Co. and the recently created Aircraft Division of Hughes Tool Co.

Howard R. Hughes reorganized his aircraft holdings last January and set up the Howard Hughes Medical Institute. At that time he severed the aircraft company from its parent concern, the Hughes Tool Co. It was reported that a "substantial part" of the aircraft company was turned over as the initial donation to the medical research institute, making it sole owner of Hughes Aircraft Co. (AVIATION WEEK Jan. 18, p. 14).

The Aircraft Division of Hughes Tool Co. retained such projects as the flying boat and the giant helicopter. Hughes Aircraft Co. is primarily an avionics concern.

Hughes is president of both companies.

▶**Top Staffs**—The management list shows the following vice presidents for Hughes Aircraft Co.: general counsel, H. B. Hall; director of research & development—missile, N. I. Hall; plant manager electronics, R. B. Parkhurst; director of research & development—radar, R. J. Shank; plant manager—missile, W. W. Wooldridge.

Below the rank of vice president are: director of research & development labs, A. V. Haeff; administration director, L. H. Scott; controller, F. G. Hall; di-

PAA Orders 15 DC-7Cs

Pan American World Airways' $33-million order for 15 of the new, longer-range Douglas DC-7Cs for delivery early in 1956 has stirred industry speculation on the immediate future role of turbojet transports.

Some industry observers believe the PAA order will have a strong influence on prolonging the future of propeller-driven aircraft as a mainstay of airline operations for at least the next five years. Pan American earlier ordered seven DC-7Bs from Douglas.

PAA's order came just a few days after the Boeing 707 jet transport flew for the first time (see p. 14). The airline has a contract with de Havilland Aircraft for three long-range Comet 3 jet transports and an option for seven more of the planes (Aviation Week Oct. 27, 1953, p. 13).

PanAm is expected to use the Douglas transports on its North Atlantic routes.

Big difference between the DC-7C model, now entering production, and the earlier DC-7 models is increased engine power, enlargement of the external configuration, increased fuel capacity and consequent range extension.

The DC-7C's wing is 127 ft., 6 in. long, 10 ft. longer than the DC-7 wing. Vertical stabilizer and rudder has been extended approximately two feet in height.

The new version will use the DA-4 model of the Wright R3350 Turbo Compound engine providing an additional 20% power. Inboard engines will be located five feet further away from the fuselage. This is made possible by an extension of the new transport's wing root.

Position of the engines will allow a 70-in. clearance between the propeller tips and the fuselage, resulting in a noise level more comparable to that of the DC-6B. The noise level of the DC-7 has been a source of criticism and concern among the airlines now flying the earlier models.

Fuel capacity in the DC-7C has been increased from 6,400 gal. in the DC-7B to 7,860 gal., giving the airplane a range of more than 5,000 mi.

Pan American claims it will be able to carry up to 58 passengers in the DC-7C plus baggage, cargo and mail with provision for more than 1,200 gal. of reserve fuel after flying nonstop for 5,000 mi.

The new aircraft has been designed for 140,000 lb. gross takeoff weight and 107,000 lb. for landing.

rector of contracts & program, R. E. Wendahl; director of aircraft operation and flight test, C. A. Shoop; director of field service and support, E. M. Boykin; acting director of semiconductor, J. S. O'Flaherty; industrial relations director, W. G. Tuttle; director of industrial security, J. P. McCarthy; quality control director, D. A. Hill; chief of materiel, S. H. Bellue; procurement manager, O. D. Berry; general purchasing agent—research & development, D. Patrick; general purchasing agent—production & plant, J. G. Beamish; purchasing agent—subcontracts, K. E. French.

Management staff for the Aircraft Division of Hughes Tool Co.: vice president and liaison representative, Gen. Ira C. Eaker; vice president, R. H. Sherwood; vice president and general manager, R. E. Hopper; director of facilities & construction, J. R. Jerman; administration director, W. D. Reed; controller, W. B. Garoutte; quality control director, L. P. Sonsini; director of manufacturing, W. W. Lampkin; director of engineering, C. B. Jones; Long Beach plant director, W. L. Berry; director of contract administration, P. B. Proctor; industrial relations director, A. M. Clark; general counsel, C. E. Schaaf; and director of procurement, M. E. Taylor.

$22-Million Airport Aid Voted by House

House has approved the Administration's request of $22 million for federal aid to airports, reversing an Appropriations Committee decision which flatly refused to reinstate the program.

The 157-to-61 approval came after President Eisenhower told congressional leaders he wanted the fund restored.

This virtually assures a $22-million appropriation by Congress. Sen. Pat McCarran and other key senators on the Commerce Appropriations Subcommittee do not believe the $22 million proposed by the Administration is enough.

▶ **'Propaganda'**—Rep. Prince H. Preston, Jr., who sponsored the move, told the House that local communities have sold $78 million in municipal bonds on the assumption they would get federal funds to help build airports.

Rep. John Taber, Appropriations Committee chairman, said House members had been "bunkoed by propaganda."

Other developments were:

• **New international facilities.** CAA asked $600,000 for construction of air navigation facilities at Cold Bay, Alaska, and $860,000 for operation of the Cold Bay installation and an installation at Balboa, Canal Zone. The House approved the projects but directed CAA to finance them with funds out of its regular fiscal 1955 appropriation.

• **Elko, Nev., Airport.** The House approved $69,499 for damages during the 1952 "haylift" by heavy military aircraft. This reversed the action of the Appropriations Committee, which refused the money.

• **Washington National Airport.** The $400,000 requested to establish the airport as a separate corporation was turned down, since legislation authorizing the incorporation has not been passed—and probably will not be (Aviation Week July 19, p. 20).

The House committee gave CAA less than a day's notice to appear in defense of the airport money and its other requests. CAA Administrator Fred Lee was out of town. The task of supporting the program fell to Assistant Secretary of Commerce for Administration, James Worthy.

▶ **Opposition**—At hearings Appropriations members were antagonistic to the airport program:

• Rep. Cliff Clevenger, chairman of the Commerce Appropriations Subcommittee, argued if federal money is used to finance airports, the railroads would be justified in demanding federal money for transportation facilities.

He observed: "Suppose . . . the new management of the New York Central would find that it needed a couple of hundred million dollars for new stations and new passenger facilities. Is it any more fantastic to expect that they might request and be entitled to it, inasmuch as they have also been paying for this airport program . . ."

• Rep. John Rooney, ranking Democrat on the subcommittee, suggested that "we should be moving the other way—making the airlines build and carry their own airports. . . ."

Player to Join ATA

Willis Player, special assistant to the Assistant Secretary of Navy for Air, has been appointed director of public relations for Air Transport Assn. Elmer D. Thompson remains as director of information for the association.

Player, former vice president of Northwest Orient Airlines and onetime public relations director of Pan American World Airways, will join ATA Sept. 1. He will finish his special Navy assignment sometime in August.

During World War II, he was with the Air Combat Intelligence Division of the Navy. He has worked for Booth Newspapers, Inc., Chicago Daily News and the Wall Street Journal. He is a graduate of the University of Michigan and now lives in White Plains, N. Y.

Slick Anti-Trust Suit To Get New Hearing

Slick Airways' $30-million anti-trust conspiracy suit against American, United, and Trans World Airlines is again active—after four years' delay due to legal jurisdictional dispute.

Airline attorneys are expected to continue taking depositions for almost another year.

The case tentatively is set to come up before the U.S. District Court, Trenton, N. J., in October 1955.

▶**Triple Payment**—Slick's suit claims damages of $10 million against the three airlines and their "agent," Air Cargo, Inc., and says law "commands" the payment be trebled.

Declaring that 300 out of 544 shares of Air Cargo are owned by American, UAL and TWA, the suit charges that the association's policies "have been dominated and directed" by the three airlines.

The three airline defendents first had sought to have jurisdiction over the case assigned to Civil Aeronautics Board.

The district judge twice ruled that an anti-trust proceeding was a matter for court, rather than regulatory agency, jurisdiction. The U. S. Court of Appeals for the Second District upheld this decision.

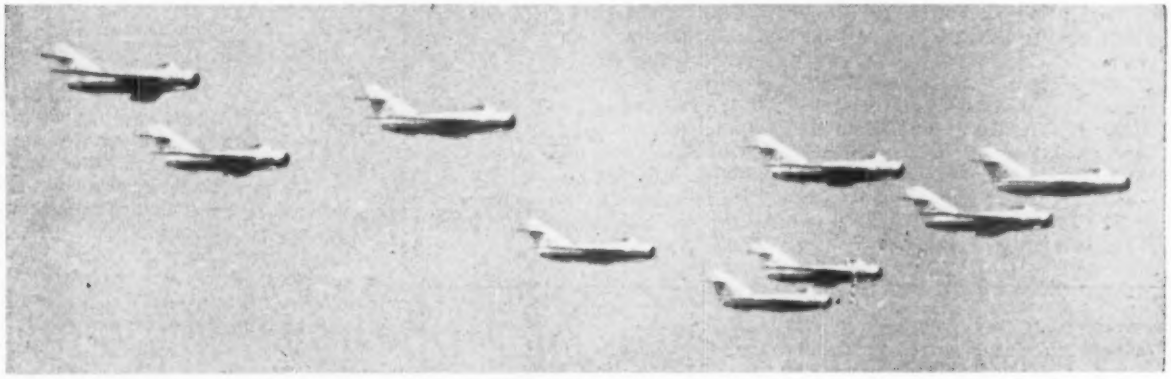
Last October, the U. S. Supreme Court declined to hear the case, paving the way for a showdown court case to be conducted before the Trenton district court.

▶**Three Scores**—The suit alleges that the defendent airlines "conspired to monopolize, monopolized and attempted to monopolize airfreight transportation" and "conspired to restrain trade or commerce" on these three scores:

- By a "deliberate attempt through predatory rate policies and a process of attrition to waste the resources of (Slick) and other freight carriers and to cause them to operate at a substantial loss."
- By "the abuse of the privilege of intervention and participation in CAB proceedings."

The suit charges American, UAL, and TWA with an "organized, rehearsed and well-planned campaign" before CAB, "conspiring first to block the issuance of a certificate (to Slick), if possible to do so, and second to delay it for the greatest possible length of time—well knowing that the issuance . . . would substantially increase (Slick's) ability to withstand (their) predatory rate practices and unfair competitive practices. . . ."

- By a "campaign of unfair competitive practices designed to appropriate" Slick's freight business.



Russian Jets, Copters Buzz Spectators

Sweptwing Russian jet fighters (above) and seven LAR3 helicopters (left) fly close over the heads of Russian spectators during the annual aviation day celebration at Tushino Airport near Moscow last May. Pictures were distributed only recently by the official Russian picture agency, Sovfoto.

The jets appear to be MiG-15 single-seaters. Nine are visible as they fly a fairly tight formation. In the original print they appear to be only a few hundred feet over the crowds.

Seven Russian copters are seen, also at low altitude, a practice prohibited at U. S. air displays for safety reasons.

First view of this craft appeared in Aviation Week Nov. 23, 1953, p. 20. Resembling the Sikorsky S-55, the Russian copter features a four-blade main rotor. An unidentified coffin-like bulge is under the belly just behind the nose.

Foreign observers received their first view of new large Russian bombers powered by 15,000-lb-thrust-class jets during this year's May Day celebrations (Aviation Week May 31, p. 12).

BOAC to Buy U.S. Stratocruisers

British airline negotiates for UAL, PAA 377s and Qantas 749 Connies to replace Comet 1 fleet.

British Overseas Airways Corp. is negotiating with United Air Lines and Pan American World Airways to buy UAL's entire fleet of six Boeing Stratocruisers and two from PAA to replace its grounded de Havilland Comet 1s.

BOAC also has purchased one Constellation 749 from Lockheed Aircraft Corp. and is working out final terms of an agreement to buy an additional four Connies from Qantas Empire Airways.

"And we're trying to find someone who has three more 749s for sale and will make them available when we want them," a New York spokesman for BOAC told AVIATION WEEK. "We want to buy from an airline."

The purchase plans confirm a forecast two months ago that the British international airline would be forced to buy U. S. equipment to fill gaps left in its fleet after BOAC's six Comet 1s were grounded by three crashes (AVIATION WEEK May 10, p. 13).

▶ **Unmarked Price Tags**—British Overseas already has agreed in principle to buy United's and PAA's Stratocruisers. Still to be worked out are the price tags, delivery dates and purchase terms.

The airline spokesman says UAL's 377s will require cockpit modifications and propeller changes but Pan American can go into service with slight revisions.

The Boeing transports are scheduled for operation on BOAC's trans-Atlantic route, mainly in aircoach configuration.

Unconfirmed reports early last week said BOAC was trying to lease eight Constellations and eight Stratocruisers, and a company release said only that the airline was trying to "acquire" the transports.

The New York spokesman says his company had considered leasing the U. S. equipment but dropped the idea early in the negotiations.

▶ **Encouraging Profit** — In London, meanwhile, BOAC board chairman reports a net profit of $182,000 for the first quarter of fiscal 1954/55, despite the loss of its Comets during the first month of the April-June period.

"True, the amount is sadly below what we had budgeted to make with Comets in operation," he says, "but nonetheless, the figure is encouraging.

"Naturally, withdrawal of Comets has been a body blow to BOAC. We were pioneering this highly attractive form of advanced and speedy air travel. It is, even at this stage, inappropriate to make definite statements about precise mechanical causes of the disastrous troubles.

"Nonetheless, sufficient has been disclosed to support the faith that—modified, tested and proven on the routes we have established ourselves—the Comets will fly again."

▶ **Comet Future**—The airline expects to put its 12 Comet 2s into operation as soon as they are delivered after the Royal Aeronautical Establishment at Farnborough reaches a decision on the cause of the jet transport crashes. The Series 3s will be placed into service with Equal speed.

A BOAC source says the Comet 1s also may resume operation if the Farnborough verdict is clear cut and shows the trouble can be fixed.

When the Comets are put back into operation, BOAC will dispose of the Lockheed Constellations it now is buying. The Stratocruisers will be replaced as the British airline takes delivery on 33 turboprop Bristol Britannias.

Feeder Outlook

- **Permanent certificates win approval in House.**
- **Senate will take action soon on similar measure.**

Two developments have heightened the prospect that Congress will dictate through legislation permanent certificates for local service airlines to Civil Aeronautics Board.

• The House unanimously and without debate passed a measure sponsored by Rep. Carl Hinshaw, that would require CAB to grant permanent certificates to the existing 14 local service lines as "the first essential step" toward the goal of "subsidy-free, adequate air service to the small communities in the country."

• Sen. Pat McCarran introduced an identical measure in the Senate, promptly scheduled for action by the Interstate and Foreign Commerce Committee.

▶ **CAB 'Wisdom'**—Recommending the legislation, the House Interstate and Foreign Commerce Committee applauded the "wisdom" of CAB in authorizing local service lines, rather than trunk carriers, to develop local traffic, and declared:

"It would be a disastrous mistake for CAB to reverse this policy at this state. The trunk airlines are geared for long-haul operations and, if required to serve these small communities, would provide only the minimum service ordered. . . . This would undoubtedly cause a serious drop in traffic and completely frustrate all that has been developed in the past five years by the local airlines."

▶ **'Vicious Circle'**—The committee pointed to the "vicious circle" under which local lines cannot replace uneconomic DC-3s because of their temporary certification and cannot obtain permanent rights because their operations are not economic.

"One of the principal objects of this legislation is to break that circle and encourage the development of a suitable aircraft for the local service airlines."

Other House committee points:

• Instead of turning local service points over to trunklines, the feeders should be given access to the large traffic centers. "The Board can strengthen route structures by adding new points, particularly strong terminal points or by removing or reducing service to weak points," the committee proposed.

• Apparently attacking CAB's refusal to consider the capital investment of Pioneer Air Lines in Martin 2-0-2s in setting the carrier's mail rate, the committee observed: "It appears that the CAB has been unduly severe.

"Where one carrier is retroactively penalized in a mail-rate conference for business decisions previously taken with the knowledge of the Board, the consequent damage to the future initiative of all carriers exceeds the immediate monetary saving to the government. The Board has responsibilities which it must observe, but on the other hand it must allow carrier management a sufficient amount of discretion and initiative to enable them to fully develop their companies."

• Permanent certification, the committee declared, will enable CAB to "devote the time previously spent on periodic renewal proceedings for the local airlines in a continuing effort to strengthen these carriers."

Piasecki Reinforces H-21 Rotor Blades

USAF has approved a modification program for the Piasecki H-21's rotor blade and the helicopter—grounded since mid-May—will go back in operation as fast as installations can be made.

A metal reinforcement is being installed on the blade's trailing edge, following investigation of a cover failure at Edwards AFB "caused by variations of the wood properties of this particular blade." Piasecki says its engineers, assuming that every H-21 blade could have this weakness, designed and tested the reinforcement.

The H-21 blade is made to Piasecki specifications by the Parsons Corp., Traverse City, Mich.

PAA Asks New Rates To Aid Air Securities

The air transport industry needs a new mail rate policy to help re-establish public confidence in airline securities, according to Henry J. Friendly, general counsel of Pan American World Airways.

In testimony before Civil Aeronautics Board on the trans-Atlantic final mail rate case, Friendly said present policies are hampering development – particularly in the international field where airlines depend on government aid.

► **Security Doldrums**–Rates of return on investment, fixed by the Board as reasonable for international operations, are too low and their attainment too uncertain to attract capital, he said. Friendly adds that airline securities have remained consistently in the doldrums despite the fact that the nation is enjoying the biggest boom market in its history.

PAA's counsel quoted Robert B. Murray, Undersecretary of Commerce for Transportation, who said recently: "We must face the fact that, in general, the man with a dollar to invest does not yet regard the air transport industry as a particularly desirable place for his money."

A recent report by the Aviation Securities Committee of the Investment Bankers Assn. said: "Investory confidence in the air transportation industry is at one of the lowest points that it has been since the Civil Aeronautics Act was passed in 1938" (AVIATION WEEK July 12, p. 42).

Friendly referred to that portion of the report which said: "In recent years, the interpretation of the act appears to have taken on an increasingly restrictive character, to such a degree that, in our opinion, the carriers operating services requiring government financial support are not receiving the income necessary to enable them to maintain and continue the development of air transportation to the extent and of the character and quality required for the commerce of the U. S., the postal service and the national defense."

► **5% Return**–Pan American's rate of return since the war has averaged 5%, Friendly told the Board, "well below the return of stable electric utilities whose investors face nothing like the risk international airline investors run. In consequence its stock is selling at only two-thirds its book value," he said.

Current rate-making policies of the Board do not take into account present-day problems of obtaining capital, Friendly said. A new and broader approach is needed if the Board's duty to develop the air transport industry is to be fulfilled, he added.

Aircraft Builders Need Higher Profit: Yeasting

Los Angeles–The aircraft industry needs greater financial strength if it is to carry out its responsibilities as one of the largest manufacturers, cautions J. O. Yeasting, vice president-finance of Boeing Airplane Co.

"We are a very important segment of the national economy," the Seattle executive told the Los Angeles Society of Security Analysts last week.

To maintain their free enterprise position in the national economy, Yeasting believes airframe manufacturers should receive a higher margin of profit on their volume of business.

Boeing realized about 2% net on last year's business, Yeasting says, and expects "3% to 3.25%" this year due to revision of the excess tax structure.

► **Increasing Costs**–The aircraft executive points out that complexity of new airplanes is increasing costs. Comparing the B-17 of World War II with the B-47 now rolling out of Boeing's Wichita plant, Yeasting says:

"Where the B-17 had little electronic equipment, the B-47 has more than 1,000 tubes, each of which costs three times as much as a 21-in. television tube."

Windtunnel testing was a mere 150 hr. on the B-17, compared with 6,000 hr. on the B-47.

► **Future Money**–Extensive research and development is necessary for future aircraft and missiles and "more money should be available for the job," Yeasting warns.

"In the best interest of the citizens and military security, it would be best if the government would promote financial strength for the job that lies ahead," he says.

We have gone some way in leveling out the peaks and vallevs in aviation but an effort must be made to bring about more stability. "There still are too many starts and stops in the business," Yeasting says.

Convair to Hire 1,000 For Weapons Projects

San Diego, Calif.–Convair will add more than 1,000 engineers and technicians to its engineering department during the next year for work on several highly restricted projects, chief engineer Frank W. Fink reports.

Development work on the projects already is underway and hiring will start immediately, he says.

Convair will send personnel interviewers to major cities and colleges in the United States to explain employment opportunities to applicants.

Four hundred of the new personnel will be assigned as electronics engineers and technicians to long-range projects under development for the armed forces.

Additionally, specialists in aeronautical engineering are needed.

SBA Aircraft Loans

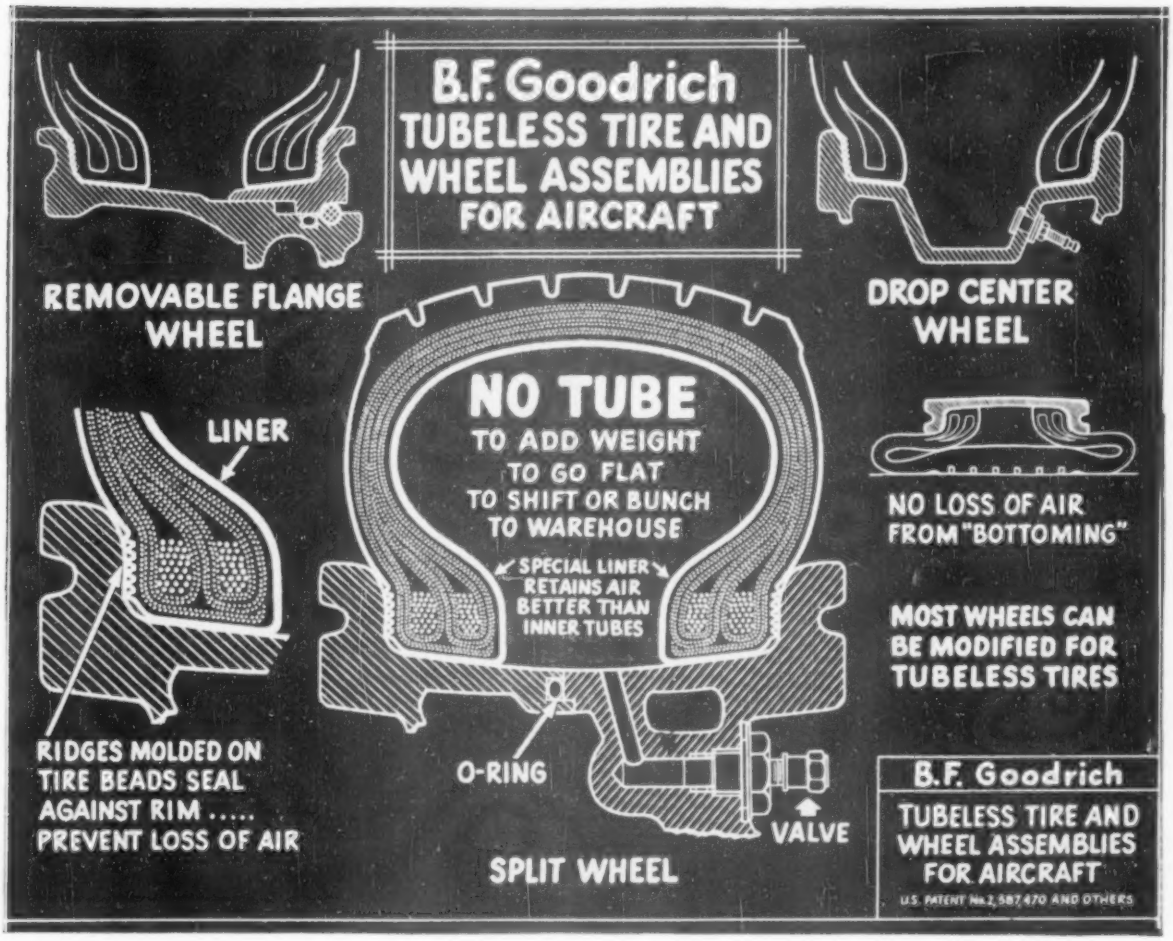
Small Business Administration has announced four loans to small aviation and electronics firms.

They are: Resdel Engineering Corp., Los Angeles, electronic research and development firm, $81,000; The Aid Corp., Clayton, Ga., manufacturer of aircraft parts, $75,000; Texas Tool & Machine Co., Ft. Worth, Tex., manufacturer of aircraft tools and gages, $25,000; Oregon Electronic Manufacturing Co., Portland, Ore., manufacturer of electronic equipment, $75,000.

New Three-Blade Hartzell Props

First view of Hartzell's new three-blade propeller for light aircraft (Aviation Week Sept. 21, 1953, p. 15) shows them installed on the swept-tail Aero Commander 560, twin-engine business plane that recently went into production. The new Hartzells have metal blades and are full feathering with hydraulic control. In addition to the Aero Commander 560 installation, they also are going onto the earlier 520. They are said to give less vibration than two-blade type, quieter and add about four miles per hour to cruise speed. Price: $2,180 a set with two-blade props in exchange.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



How Tubeless Tire for airplanes cuts weight, gives safer landings

TAKE OUT the inner tube and you do more than save weight, simplify assembly. You get a high-pressure airplane tire that's safer, too. B. F. Goodrich engineers were the first to develop and produce one. The blueprint above helps show how they did it.

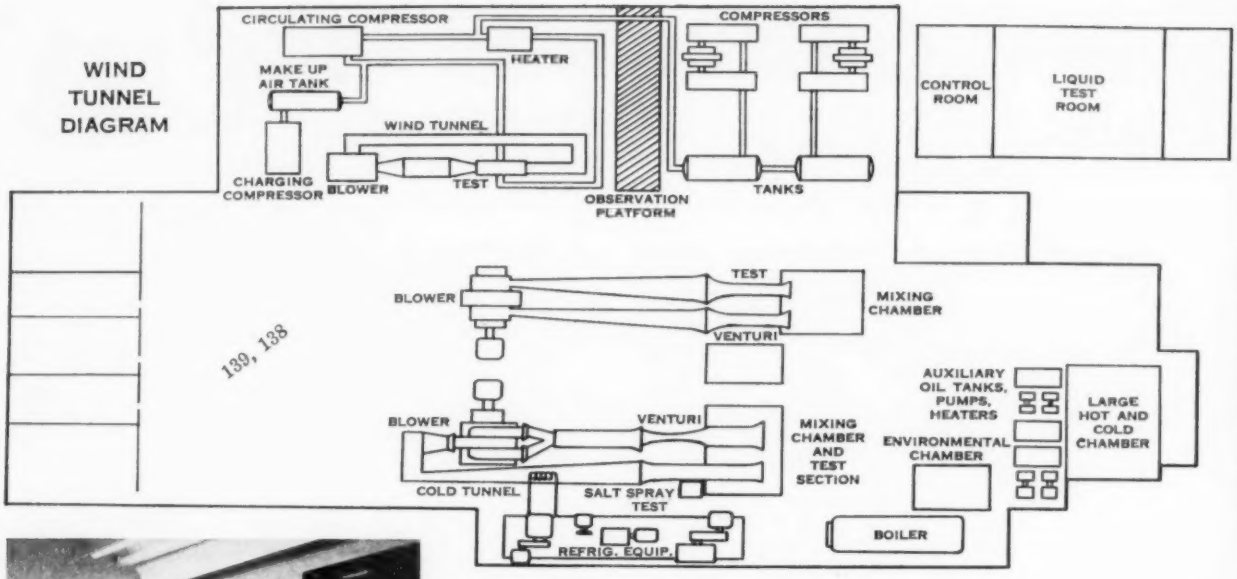
Instead of an inner tube, the B. F. Goodrich airplane Tubeless Tire has a patented inner liner that's part of the tire itself. There is *no tube* to add weight. No tube to go flat—to bunch up or shift during landings and take-offs. Instead of tire and tube, there's only one unit to mount. Only one unit to warehouse, too.

The patented inner liner retains air much longer than conventional tubes. Ridges molded on the outside of the tire bead prevent air loss around the rim. On two-piece wheels, a rubber O-ring seal keeps air from escaping through sections. A special Navy "bottoming" test shows the new BFG airplane Tubeless Tire loses no air even when compressed flat to the rim.

The B. F. Goodrich airplane Tubeless Tire will soon be in general use on Grumman Cougar jets in Navy service. B. F. Goodrich is now speeding development for use on commercial planes, as well as other military aircraft. It's another first in aviation tires from B. F. Goodrich, leader in rubber research and engineering.

Other B. F. Goodrich products for aviation include wheels and brakes, De-Icers, heated rubber, Pressure Sealing Zippers, Avtrim, inflatable seals, fuel cells, Rivnuts, accessories. *The B. F. Goodrich Company, Aeronautical Sales, Akron, Ohio.*

B.F.Goodrich
FIRST IN RUBBER



Empirical data developed by the Clifford Wind Tunnel Laboratory over many years permit a quick, accurate "translation" of thermodynamic theory into practical design without the necessity of developing successive pilot models to achieve a satisfactory exchanger.

Clifford's Wind Tunnel

The largest technical facility of its kind is expanding to meet the increasing problems of aircraft and missile heat exchangers, valves and temperature controls.

Basic to the aircraft industry's attack on the thermal barrier are laboratory facilities capable of accurately reproducing the conditions encountered by aircraft in actual service.

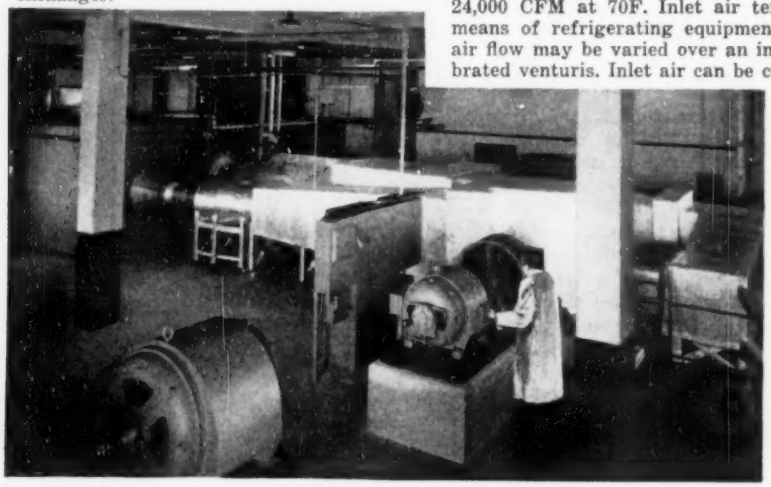
As designers work for higher speeds over a greater altitude range, the heat transfer problems associated with maintaining the lubricating oil at optimum temperature become increasingly difficult. So do heating or cooling the cockpit, cabin, bomb bays and other areas.

Meeting these problems requires a continuous program of basic research, development and testing of heat exchanger systems.

Clifford's wind tunnel, the largest, most complete installation exclusively devoted to aircraft heat exchangers, permits highly accurate simulation of service conditions.

A hot tunnel for testing oil-to-air heat exchangers up to 36" in diameter has a design airflow capacity of 48,000 CFM at 70F. Air flow may be varied over an infinite range of values and is measured by means of calibrated venturis. Temperature may be controlled to within plus or minus one degree F.

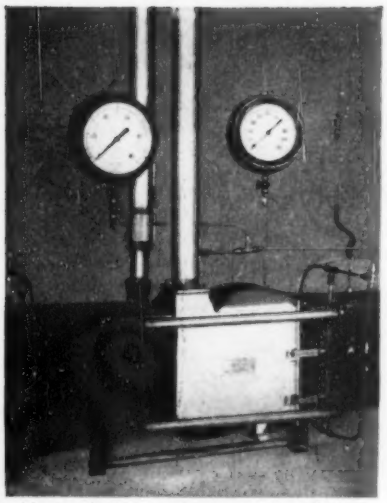
A cold tunnel having a test section diameter of 24" has a design air flow of 24,000 CFM at 70F. Inlet air temperatures as low as —70F are attained by means of refrigerating equipment of 120 tons capacity. As in the hot tunnel, air flow may be varied over an infinite range of values and is measured by calibrated venturis. Inlet air can be controlled to within plus or minus one degree F.



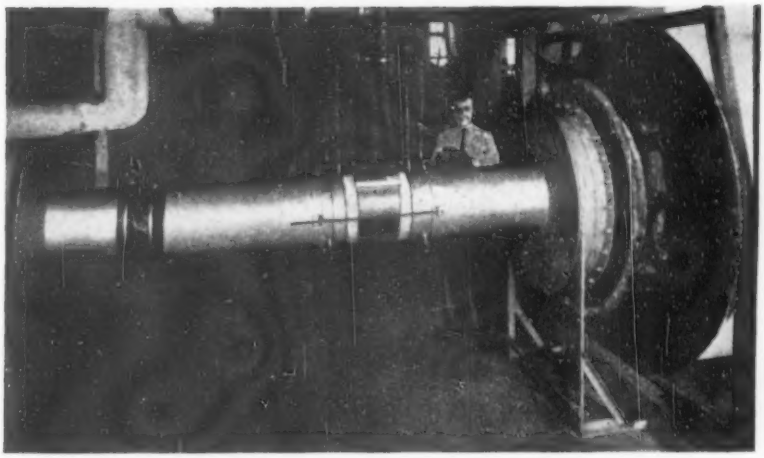
A circulating system which can deliver oil at 1375 pounds per minute at 100F to the test section of either tunnel maintains constant temperature through a 3 way valve and recorder-controller. Flow is measured automatically by electronic scales incorporated in a dead weight weighing system.

A new tunnel facility which provides air at 1200F is designed to test aluminum and stainless steel air-to-air heat exchangers. This tunnel simulates compressor bleed conditions with flows up to 180 pounds per minute at 1200F and 250 psi. Special carbon ring compressors are used and a gas heater with a rated capacity of 3,500,000 BTU per hour maintains bleed air temperatures. Ram air conditions can be closely simulated by a 75 hp. blower rated at 4600 CFM at 70F and a 5.1"Hg. head.

A valve blow down test facility utilizes air

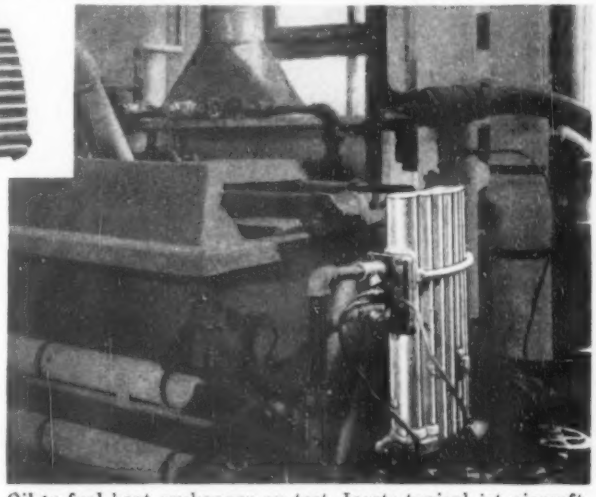


Air-to-air heat exchanger installed in wind tunnel test section. This is one unit of an aircraft air-expansion turbine refrigeration system under test.



Cylindrical oil-to-air cooler undergoing performance tests.

Laboratory . . .



Oil-to-fuel heat exchanger on test. Inset: typical jet aircraft oil cooler.

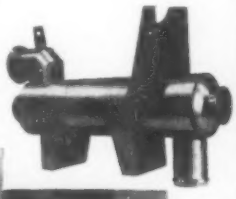
from the compressors at 250 psig. and at flow rates of 120 LB/m. Tied in with the gas heater, outlet temperatures up to 1200F can be developed for the testing of butterfly valves.

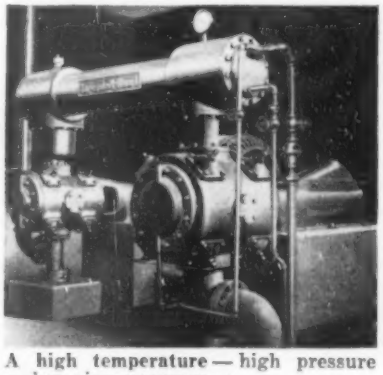
Liquid-to-liquid heat exchangers such as lubricating oil coolers are tested for performance with equipment capable of producing fuel flows up to 1000 pounds per minute and pressures as high as 3000 psi. Oil flows up to 500 pounds per minute at operating pressures of 300 psi and temperatures up to 500F are available for these tests. Multiple fuel and oil storage systems permit various test fluids to be employed.

Other facilities include a controlled temperature test room measuring 31′ long, 14′ wide and 13½′ high. Temperatures from —70F to 150F can be maintained at wind velocities up to 60 mph.

An environmental test chamber of 27 cubic feet capacity provides a controlled range of conditions from —100F to 225F temperature extremes and 5% - 95% relative humidity. Altitude pressures can be simulated from sea level to 80,000 feet.

Complete chemical and metallurgical facilities are maintained and in addition, considerable specialized equipment of a highly advanced type has been designed and built by the Clifford Company in connection with its proprietary processes and methods.





A high temperature — high pressure carbon ring compressor.

Representative heat exchangers and associated valves designed and produced by the Clifford Company for application in military and commercial aircraft. Inset: stainless steel air-to-air heat exchanger.

Clifford Manufacturing Company, 136 Grove Street, Waltham 54, Massachusetts. *Division of Standard Thomson Corporation.* Sales offices in New York, Detroit, Chicago, Los Angeles and Waltham, Mass. 7.4.13

HYDRON METAL BELLOWS — CLIFFORD MANUFACTURING CO WALTHAM, MASS. — HEAT EXCHANGERS

Specialized electronic components for aircraft

From idea to pilot model in DAYS!

Quick design, development and manufacture is the specialty of Electronic Specialty Co. We develop new electronic devices *from bare requirements* in as little as 10 days—often in only a week! Pilot models delivered in 2 to 3 weeks! Production is fast on all types, sizes and quantities of dependable electronic relays, timers, sequencing controls and sensing equipment.

EXAMPLES OF ELECTRONIC SPECIALTY'S QUICK SERVICE

Delivered first unit 10 days... prototype in 7 days...after receiving requirements. This T-178-A Pulsitometer applies a 28-volt current, and cuts off after 3 seconds. Built for one of America's largest jet engine manufacturers.

Delivered 2 units in 3 days after receipt of order from scientific instrument manufacturer. This T-177-A Pulsitometer provides a 150-millisecond time pulse for reconnaisance aircraft camera control.

Let us work out your electronic equipment problems. Write for details...telephone or wire.

ELECTRONIC SPECIALTY CO.
CONTRACT DIVISION

3456 GLENDALE BLVD. • LOS ANGELES 39, CALIFORNIA

Battle Report From Indo-China: Third of Series

C-119 Score: 'Nearly Perfect'

Handful of Fairchild Boxcars, aided by C-47s, starred in epic holdout, flying supplies into 'suicide pocket.'

(McGraw-Hill World News)

Tourane—Dienbienphu was a costly military fiasco that has sealed the fate of north Vietnam and, perhaps, of all Indo-China. But it should be remembered as an interesting aerial supply operation.

More than 7,000 tons of military supplies were dropped into the French garrison between Mar. 13, when the Communists attacked, and May 7 when the position was overwhelmed.

Part was parachuted from C-47s, but just over 5,000 tons went down out the gaping rear-ends of C-119s, loaned to France by the U. S. Air Force. Without the C-119s, it is estimated that the garrison would have run out of supplies by mid-April. C-47s could not have carried the heavy load.

▶ **Suicide Run**—Dienbienphu sits in a cup of mountains. The valley floor is at an altitude of approximately 2,000 ft., with the mountains rising to 6,000 ft.

French positions were located in a small pocket on the floor of the valley, while the Communists held the mountains all around. The Reds moved anti-aircraft guns onto the heights, at the end of the battle, more than 100 37-mm. guns were in action on the Communist side.

Aircraft supplying Dienbienphu descended into the cup to make the drops. Until Mar. 27, C-47s went down to 1,500 and 2,000 ft. above the valley, or 2,000 ft. below the lip of the cup.

Each C-47 had to make 20 passes before kickers could shove the full load out the door. This was time consuming; so much so that it would have been impossible to put enough C-47s over the drop point per day to keep the forces adequately supplied. More important, the slow dropping procedure meant that the C-47s were circling in a well defined pattern right in the center of the circle of ack-ack for periods of 20 min. or more.

By Mar. 27, seven C-47s had been shot down. With these losses, the French decided to have the C-47s drop from 8,000 ft., i.e. 6,000 ft. above the drop zone, during the day. Only at night did they venture down to the 1,500 and 2,000-ft. level.

▶ **Near Perfect Score**—The C-119s, on the other hand, dropped their heavy loads (seven tons) in one pass with near perfect accuracy. They seldom were in the zone of maximum ack-ack fire for more than three minutes. Only during the last week did the intensity of Communist fire drive them up to the C-47 level.

Another characteristic of the C-119 that met the approval of its French Air Force and American civilian pilots was an ability to absorb damage suffered in battle.

Red gunners hit 57 Boxcars during the battle. All but one returned safely. That one, piloted by the legendary James B. (Earthquake McGoon) McGovern, almost made a successful crash landing in a river bed after skimming across several ridge tops. At the last second, a wing tip hit a tree on the river bank and the aircraft rolled in.

▶ **Bulldozers Drop**—American civilian pilots of Civil Air Transport, Gen. Claire L. Chennault's airline, flew the C-119s during the day, while French Air Force transport pilots flew them at night.

During the Dienbienphu operation, CAT pilots made 540 missions and dropped 3,240 tons. French flyers handled missions accounting for just over 2,000 tons.

Ammunition, rations and barbed wire made up most of the cargoes. The largest pieces of equipment were two seven-ton bulldozers. The first fell free after the straps broke, so a second 'dozer was parachuted into the position.

French officers estimate that 95% of the supplies dropped from the C-119s fell within the drop zone.

▶ **Flying Tower**—The C-119s were limited to two one-hour periods per day over the drop zone. The rest of the day was reserved for C-47s.

At night, the French Air Force maintained a flying control tower (a C-47) over the embattled position.

FAF is proud that no planes were lost on the shuttle operation from the major bases near Hanoi and Haiphong, despite the total lack of any radar control.

The only navigational aids in Dienbienphu were a French Gonion (radio homer) and a VDF (very high frequency direction finder) set. During the last few days the latter was very bad.

▶ **Complicated Plane**—CAT pilots said of the C-119: "It's a good airplane for taking a big load and dumping it, but that's about it." They claimed the old C-46 carries nearly as much at less cost but does not seem to have that im-

portant characteristic of dumping loads fast.

The C-119 also is a complicated airplane to keep flying. The U. S. Air Force ground crews, which maintain the aircraft, say the best they can do is keep 50 to 60% of their present 16 C-119s in condition to fly tactical missions—not counting those damaged in battle.

During Dienbienphu approximately 25 aircraft were necessary in order to maintain an average of 18 missions per day.

Since Dienbienphu, C-119 operations have been cut down by direction of USAF to 12 missions per day. These are flown by the CAT pilots under CAT Inc.'s contract with the French Air Force. All missions to the interior, mainly to Seno in southern Laos are drops. Some flights toting napalm tanks from here land at the air base at Nha Trang.

►**New Nords**—By September, the French command hopes to bring in a squadron of 20 Nord transports. One

T-34 Heads Up

USAF Beech T-34 Mentor primary trainer climbs straight up on the power of its 225-hp. Continental engine. Selected as the standard light trainer for USAF, Navy and the air arms of Canada, Chile, Colombia, El Salvador and the National Safety Forces of Japan, the T-34 has won every evaluation contest in which it has participated, according to Beech Aircraft Corp., Wichita, Kan.

To Better Serve You

Warner Doubles Plant Facilities
Steps-up Precision Subcontracting Work

THE Warner Division of Detroit Harvester Company has moved into a new and larger manufacturing plant.

In addition to permitting an increase in the production of hydraulic units of their own design, such as pumps, valves and actuators, this expansion places Warner in a position to take on additional precision subcontracting work for aircraft and ordnance plants.

Capitalize on Warner's ability to manufacture to exacting tolerances.

Consider Warner for the production of—

Landing Gear Cylinders, Pumps, and Valves
Hydraulic and Pneumatic Assemblies
Aircraft Fittings
Machining of Aircraft Forgings

Contact our home office in Detroit or the branch office nearest to you. Warner engineers will welcome the opportunity to serve you.

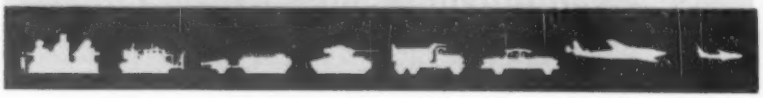
J. J. McCARTHY
520 West Avenue, Room 212
Norwalk, Connecticut
Phone: Volunteer 6-1534

C. PALMER BOYLES
56 Canterbury Drive
Dayton 9, Ohio
Phone: Walnut 4247

JESSUP ENGINEERING CO.
7227 W. 90th St.
Los Angeles 45, California
Phone: Orchard 2-1616

M. E. DOUGLAS
2242 Forest Park Blvd.
Fort Worth 10, Texas
Phone: Wilson 0555

Warner DIVISION OF DETROIT HARVESTER COMPANY
14300 TIREMAN AVENUE • DETROIT 28, MICHIGAN
DESIGNERS AND MANUFACTURERS OF HYDRAULIC PUMPS • VALVES • ACTUATORS



. . . the CONTINENTAL E-185 or the CONTINENTAL E-225

Yours in the NEW

Beechcraft

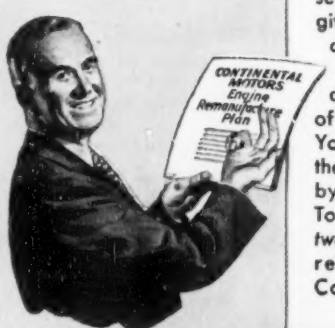
MODEL E35

It embodies wider utility than ever before, the newest Beechcraft E35, and one big reason is that it gives you your choice of power. It comes equipped with either of two outstanding engines, depending on the performance characteristics you desire . . . The standard E35, powered, as for several years past, by the 205-hp E-185, gives you 175 mph, with the thorough dependability you expect of Continental power. For speeds up to 9 miles higher, along with higher ceiling and faster rate of climb, specify the Continental E-225. You can still obtain the cruising range of the standard power plant, when you wish, by utilizing less of the engine's output . . . Today's fine Bonanzas, with choice between two proven engines, are another strong reason for choosing a plane with Continental power.

. . .

AIRCRAFT ENGINE REMANUFACTURING SERVICE SAVES YOU TIME AND MONEY

Continental's Remanufacturing Plan, now several years old and firmly established, is another good reason for choosing an airplane with Continental power. Available through 125 master distributors with dealers at practically all airports, this exchange service gives you a new factory-remanufactured engine—back to zero hours, and with factory engine guarantee—at a low fixed cost, with virtually no dead time.



Continental Motors Corporation

Aircraft Engine Division

MUSKEGON, MICHIGAN

has been flown around Indo-China on demonstration flights.

This French-built aircraft has trim, clean lines. Its payload of four-and-a-half tons is less than the C-119, but the French claim it has the desirable characteristic of being able to land at all air strips in the country. It has the same type of air-dropping equipment as the Boxcar.

A second squadron has been scheduled for the end of the year.

In the meantime, the French hope to keep the Boxcars and would like to have the present limit of 12 missions per day raised. As real fight develops for the Red River delta city of Hanoi in north Vietnam, a new heavy airlift is becoming necessary.

▶ **FAF Weakness**—The French Air Force efforts to suppress the Communist ack-ack batteries were considered so inadequate by the CAT pilots that they requested permission to handle it themselves. All they wanted were four or five fighters and a couple of B-26s to fly with their Boxcar airtrain. This request was turned down by the French command.

Considering the limited number of aircraft that they had available it perhaps was impossible for the French Air Force and the French fleet air arm adequately to have suppressed the Red guns. But little was done with what they had.

As USAF discovered in Korea, effective flak suppression requires a high order of coordination and timing. The French Air Force, here at least, lacks the command organization required for such an effort. This also is a dive bomber mission primarily. French pilots believe they should have had something like the Banshee in order to do the job instead of piston-engined fighters and B-26s.

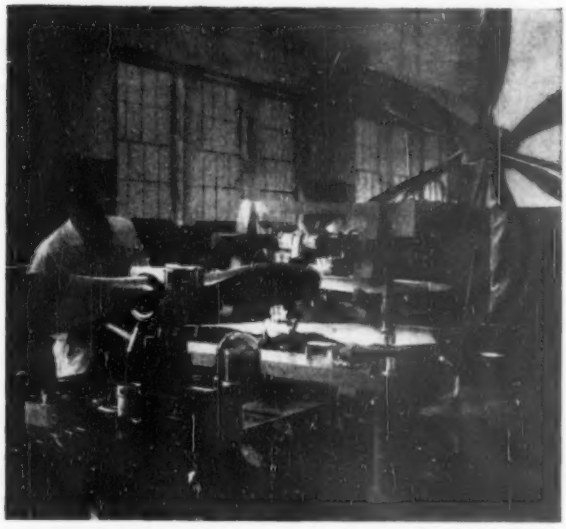
French air intelligence officers discount early reports that the Communist guns were radar controlled. They believe some were directed by old-type sound control equipment. But if the Reds were using radar guns of the accuracy of those used by Chinese Communists in Korea, it would have been impossible to drop at low level even with the C-119s except with prohibitive losses.

Also, they point out, the C-47s could not have operated at low level during the night. To throw off the sound trackers, C-47 pilots at night unsynchronized their propellers.

Murray to Test Air Communication Setup

An evaluation of international aeronautical fixed telecommunications currently is underway by a joint government-industry committee that could re-

They come from thousands of miles for Reading's unsurpassed service!

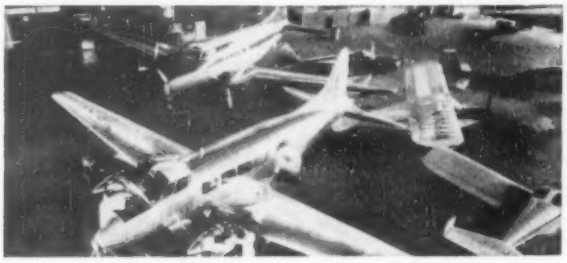


New prop shop is CAA Approved for servicing of Hamilton Standard and Hartzell propellers. In foreground is Supervisor Ed Heine who puts 16 years' prop experience into every job.

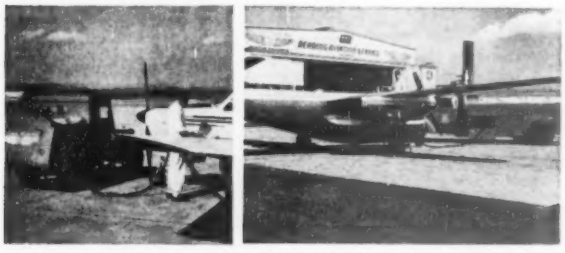
RAS INCORPORATED Reading Aviation Service Attracts Industrial, Executive, And Private Aircraft From All Over The Country For The Finest Servicing Available Today.

It is no accident that aircraft come from thousands of miles to benefit from the thorough one-stop servicing of Reading Aviation Service at Municipal Airport, Reading, Pa. Nor is it any accident that RAS uses Cities Service Aviation Products. Says President A. M. Bertolet: "A great deal of credit for our excellent reputation can be attributed to use of only the finest materials . . . materials such as Cities Service Aviation Products."

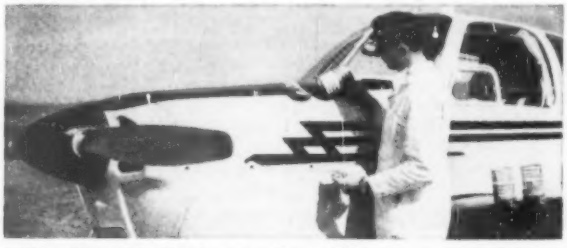
Sales and Service of DME Equipment is newest function of complete radio and electronics center. RAS is one of the very few companies in the U.S. chosen to sell and service both Narco and Bendix distance measuring equipment.



Most major inspections completed in a day. Here in the main hangar, a staff of 70 RAS specialists insure fastest, most dependable service. In foreground is twin-engine de Havilland for which RAS is sales agent.



2 Ways to gas-up with Cities Service Gasolene . . . Jeep-truck for small aircraft, large tank-truck for bigger planes. "Cities Service Gasolene gives best performance," says RAS.

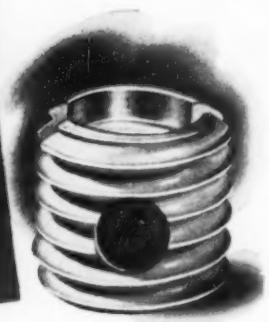


Filling Up with Koolmotor Aero Oil . . . RAS uses only new Koolmotor because, says Pres. Bertolet: "We've found it reduces oil consumption, valve guide wear and gives better engine protection."

CITIES SERVICE AVIATION PRODUCTS

New York • Chicago • In the South: Arkansas Fuel Oil Corp.

NYLOK'S Self-locking THREADED INSERTS...



*** For use principally in non-ferrous forgings, castings and extrusions**

CUT COSTS because NYLOK threaded inserts eliminate counterboring, special tapping and all the secondary operations required by other threaded inserts. With NYLOK inserts, simply drill and tap with standard tools — then screw the insert in place. They give stronger, tighter fastenings which will permit fewer fastenings per application.

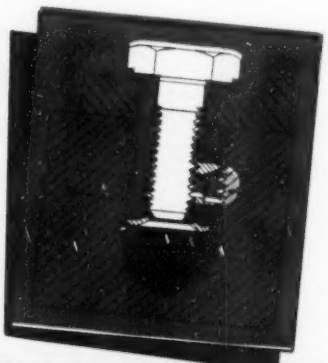
PROTECT PARTS because they eliminate thread failure in expensive castings by absorbing stresses and prevent thread wear and stripping.

DOUBLE LOCK because with the resilient nylon plug, NYLOK inserts provide a smooth, positive locking torque on both internal and external threads, thus locking the insert in the casting and also securely locking the bolt once it has been threaded into the insert.

REQUIRE NO SPECIAL TOOLS for insertion or removal. Permits use of standard screw driver. Simplifies maintenance in the field.

How NYLOK THREADED INSERTS work . . .

Resilient nylon plug (A) sets up lateral thrust on both internal and external threads, smoothly wedging mating threads together, both on casting and bolt (B) and (C). There is no galling, no thread distortion, no mutilation of mating threads. All of locking action is on threads and locking is positive. The inserts may be used and reused many times without impairing the locking feature.



For complete details on how NYLOK threaded inserts may solve your fastening problems, write today. NYLOK engineers will gladly discuss them with you at no obligation.

Write for Catalog 11 A

THE **NYLOK** *Corporation*

Manufacturers of Nylon-Locked fasteners covered by U.S. patents and patents pending

Main Offices and Factory — Elmira Heights, N. Y.

Offices in: New York City • Detroit • Chicago • North Hollywood

sult in the establishment of a single authority to govern the network at U.S. gateway points such as New York and San Francisco.

As presently constituted, Civil Aeronautics Administration and Aeronautical Radio, Inc., a private agency, both operate facilities at some of these points —resulting in duplication of services.

► **'Guinea Pig' Test**—Effort is being made by the committee, organized under Commerce Undersecretary for Transportation Robert B. Murray, to establish an authority that could designate which of the present agencies could serve the needs of operators most and economically efficiently.

New York's port has been chosen as the "guinea pig" in the evaluation, because it is best representative of the problem. Two of the world's major international airlines (Pan American World Airways and Trans World Airlines), in addition to most of the foreign airlines, serve New York. Considerable military traffic also is handled.

► **Considerable Savings**—In New York, Miami and San Francisco, CAA and Arinc operate their own fixed circuits for aeronautical communication. By combining these into a single agency to serve the airline industry and the military, there would be considerable savings both in money and in frequencies used.

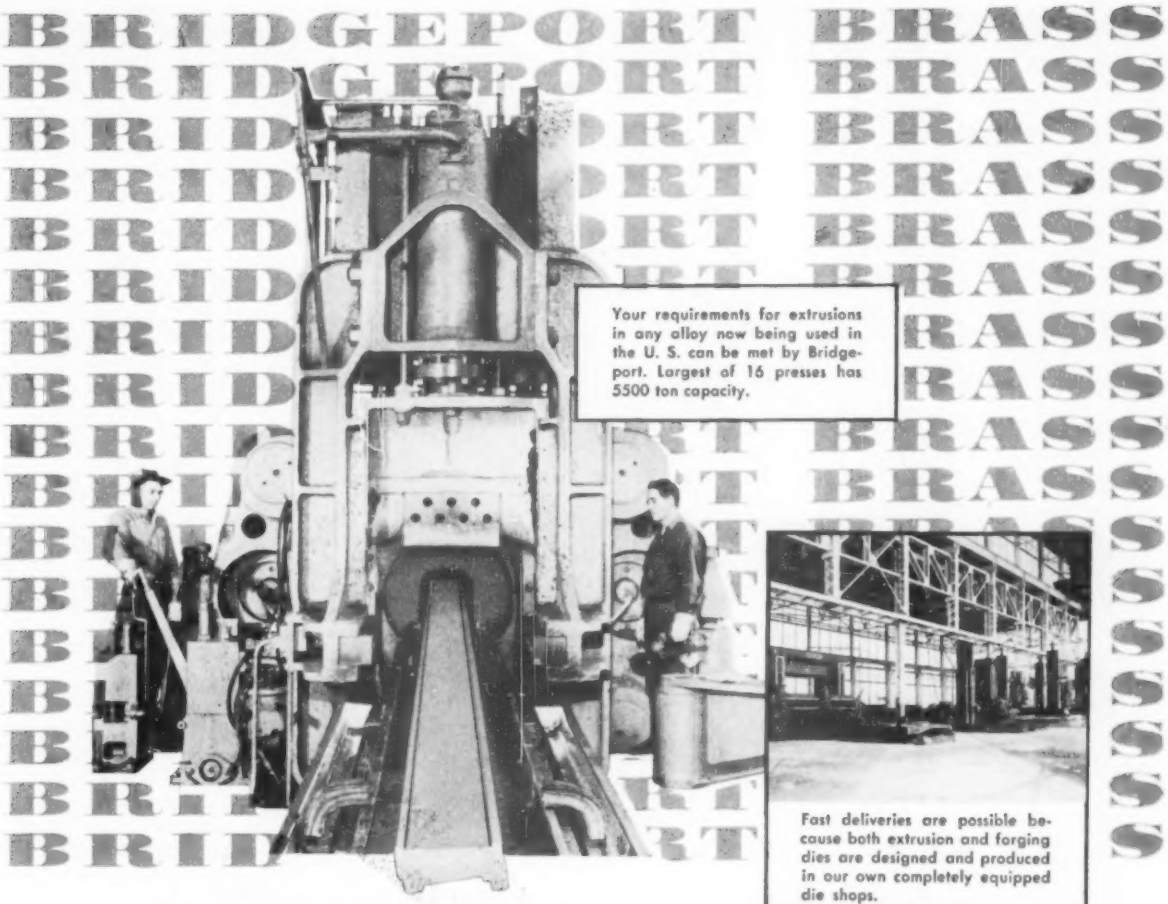
At New York, where the first evaluation is being made, Arinc has been determining what it would cost to extend its facilities in order to augment CAA's present facilities there. CAA is following the same procedure.

When both are sufficiently evaluated, the committee will determine which agency could most economically provide the necessary service.

► **Common Policy**—Arinc is the only aeronautical telecommunications agency licensed by the Federal Communications Commission outside the government. Its subscribers and members include all of U.S. scheduled airlines and various other air carriers and aircraft operators.

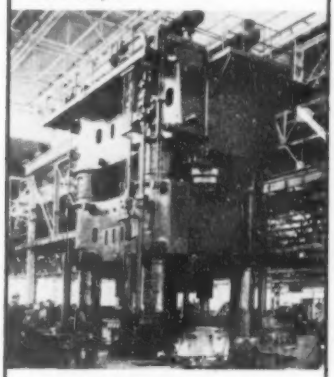
Object is to establish an aeronautical fixed telecommunications network with a common policy and with a single agency operating one specific telecommunications station. Result could be that one station would be operated by private industry, another by the government.

Members of the joint government-industry committee include: CAA Administrator Fred B. Lee, chairman; Oscar Bakke, chief of the Air Carrier Division of Civil Aeronautics Board's Bureau of Safety Regulation; J. S. Anderson, president of Arinc; E. W. Ringo; representing Transocean Airlines and Seaboard & Western Airlines; Paul Goldsboro, TWA; Capt. Waldo Lynch, PAA, and Air Transport Assn.



Your requirements for extrusions in any alloy now being used in the U. S. can be met by Bridgeport. Largest of 16 presses has 5500 ton capacity.

Fast deliveries are possible because both extrusion and forging dies are designed and produced in our own completely equipped die shops.



With facilities such as this huge, 16,500 ton forging press, one of the largest in the country, Bridgeport can meet the most exacting demands for quality die forgings. Aluminum and magnesium contour hand forgings are also produced.

A background of experience and skill that assures you quality in Bridgeport Aluminum

The experience and skill in metal production that mean greater efficiency and lower manufacturing costs to users of Bridgeport brass mill products, are now available to users of aluminum extrusions and forgings.

Bridgeport has a 90 year reputation for quality and service and over four decades of experience in extruding metals. From this background we offer skilled technical assistance and assurance of meeting your most exacting specifications in aluminum.

For a continuing, dependable source of quality aluminum products call on Bridgeport. We have the modern production facilities, the quality-control equipment, the skilled technicians and a determination to give superior service.

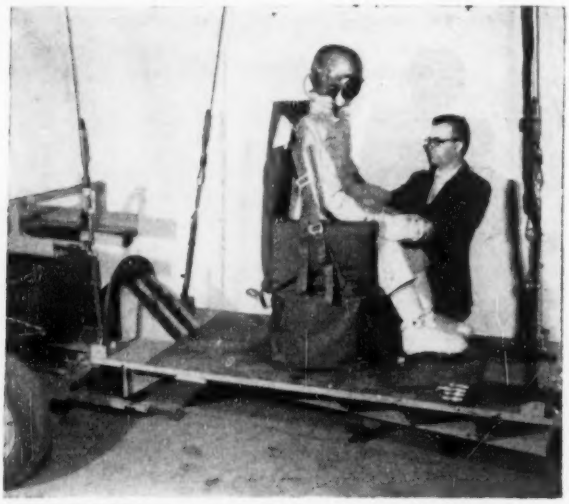
Contact your nearest Bridgeport district office for information about Bridgeport extrusions and forgings in terms of your products. We are prepared to give you immediate service and deliver quality materials on the schedules promised.

Bridgeport

BRIDGEPORT BRASS COMPANY
ALUMINUM DIVISION • Bridgeport 2, Conn.
Sales Offices in Principal Cities—Conveniently Located Warehouses
Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich.

See our exhibit at the National Aircraft Show September 4-5&6...Dayton, Ohio

BRIDGEPORT ALUMINUM



BEFORE CRASH on impacting apparatus, jointed lifelike dummy sits erect in NACA experimental seat, a cushioned unit embodying elasticity, frictional damping.

AFTER CRASH, seat is shown deformed, with dummy tilted forward, protectively cradled in pocket formed by seat back. Design eliminates injury from metal parts.

NACA Tests Promise Safer Seat Design

Experimental configuration shows how to absorb heavy impact loads and provide protective pocket that cradles passenger in a crash.

By Irving Stone

Cleveland—Recent National Advisory Committee for Aeronautics' experiments with a new seat design point the way to improved passenger safety in military and commercial aircraft.

Researchers at NACA's Lewis Flight Propulsion Laboratory have developed an experimental seat configuration whose cushioning members absorb impact loads in a crash landing and which flexes to form a pocket cradling the passenger for protection.

▶ **Bring 'Em Back Alive**—The seat studies, a natural outgrowth of NACA's crash fire work, are constructive—intention is to find out how to keep the passenger alive, rather than just determine what injures or kills him.

Final evaluation of NACA's seat studies will involve performance of the experimentally developed units under full-scale crash conditions. NACA already has set aside some service-weary aircraft for installation of these seats for full-scale proving.

▶ **Ground Work Only**—The experimental seats used in the studies are not considered suitable for aircraft applications, because they incorporate features of construction that are necessary for research but might interfere with passenger comfort.

NACA researchers are not interested in developing the seat as a marketable item. Their aim merely is to point the way to a new approach for airlines or manufacturers to pursue farther. This means that NACA will have to allow enough latitude for the seat engineer to incorporate the desired standards of comfort.

▶ **Benefits Seen**—Meanwhile the following advantages are seen for the NACA-developed seat configuration:

- **In addition to commercial** applications, use on military planes such as assault craft is seen as particularly feasible. For this type of aircraft, landings are usually rough, because they are made on poorly prepared runways.
- **Increased number** of attachment points connecting new seats to floor structure decreases possibility of seat tearing loose in a crash landing. The number of connection points on the pedestal of the new seat is far greater than conventional seat's four-point attachment.
- **Weight** probably will be kept within the limits established for conventional seats.
- **Cost** probably will not exceed that for a conventional unit, because of the relatively inexpensive materials involved.

▶ **Safety in Seats**—Aeromedical research has established that a person can withstand very high impact loads if their duration is short. Also, analysis of no-fire crash-landing accidents reveals that those passengers who are retained in their seats suffer the lowest percentage of severe and fatal injuries.

This information suggested to NACA researchers the possibility of learning how to reduce frequency and severity of injuries in this type of accident. In the aircraft used in NACA's crash fire program, researchers installed special instrumentation to gather data on forces transmitted through the airframe to the passenger cabin.

In one test it was found that loads of more than 12G were imposed. For a 200-lb. passenger this would mean a force of more than 2,400 lb. on his seat belt. Such a load might break the passenger free from his seat attachments or tear the seat from its attachment to the structure. Either situation is likely to bring injury to the pasesnger.

▶ **Lifelike Dummies**—In other crash tests conducted by NACA, lightplanes carrying dummies were used. Supplied by the military, these dummies have bone stiffness, joint action and tissue texture similar to humans. Data of loads during crashes were obtained and slow-motion pictures showed dummy reactions.

The sequences showed that a front-

First radar system to successfully combine ruggedness and reliability of military equipment with economy of industrial quantity production, SPAR's light weight and portability fit mobile warfare requirements. SPAR can be assembled and sited in less than 6 man-hours, reoriented to new runways in 10 minutes.

Address foreign inquiries to: Bendix International Div., Bendix Aviation Corp., 205 E. 42nd St., New York 17, N.Y.

Increase Airport Revenue!

Portable precision approach radar SPAR brings you all-weather flying...increases airport revenues and local town business income. Already proven, low-cost SPAR is in quantity production.

Airport managers all over the world have been waiting for a Ground Control Approach system simple enough to be operated by one man, accurate enough to insure absolute safety regardless of weather, and *inexpensive enough to fit their budgets.* Laboratory for Electronics' SPAR *is* this GCA system.

Simple. Operator sees aircraft azimuth and elevation on one high-precision B scan display screen. Indicator-control unit can be operated from field or tower.

Accurate. SPAR can guide a jet fighter or Stratocruiser to within inches of the runway centerline, and within 20 feet to the point of touchdown. Incorporates all modern developments to permit operation under worst possible weather conditions.

Inexpensive. SPAR's initial cost is only 10% that of large GCA installations . . . much lower maintenance and operating cost. Soon pays for itself in increased landing fees, hangar rents, aircraft maintenance jobs, and concession business.

SPAR

LABORATORY *for* ELECTRONICS

75 Pitts Street, Boston 14, Mass.

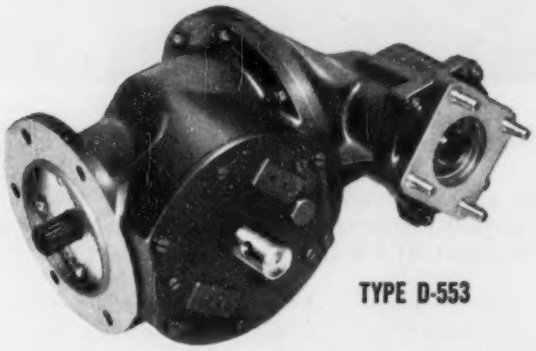
MANY PURPOSE

ROTARY ACTUATORS

EEMCO has developed many types of rotary actuators for leading air frame manufacturers for use in the newest jet aircraft and commercial airliners. The models shown here are typical of the many varied designs that have been produced for a wide variety of uses. This manufacturing experience is evidence that **EEMCO** is staffed and equipped to develop any type of actuator, rotary or linear, to **your** exact specifications designed to draw power from any source. In many cases an existing **EEMCO** model can be adapted to your specifications which will speed delivery time considerably.

TYPE C-824

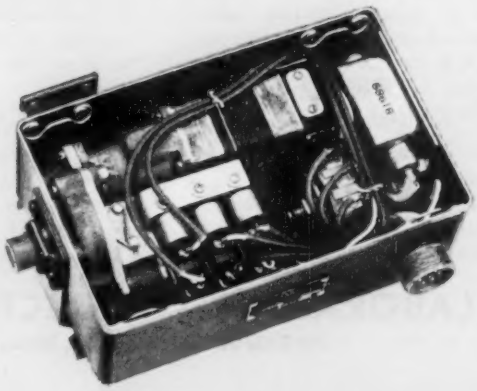
Type C-824 EEMCO reversible actuator was developed for opening and closing an aircraft canopy. It develops 150 inch-pounds of torque at 81 R.P.M. in intermittent duty, utilizing 26 volts DC. Gear ratio is 141 to 1. Weight is 6¼ lbs., including radio noise filter.



TYPE D-553

Type D-553 Vericam actuator, developed for use on Lockheed P2V., is hydraulically operated. Designed for continuous duty reversible operation, it is equipped with multiple disc torque limiter and directional torque limiter on the manual operation shaft. Normal output load at 240 R.P.M. is 250 inch-pounds. Torque limiter setting is 325 inch-pounds. Weight is 12 lbs., 5 oz.

FLEXIBLE UNIVERSAL POWER PACKAGE TYPE D-471

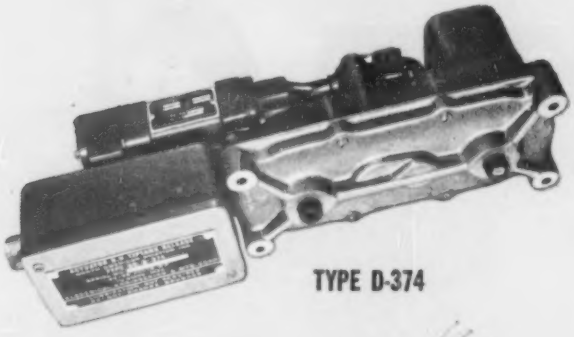


Type D-471 EEMCO rotary power package combines in one small container: motor, radio noise filter, magnetic clutch and brake, main reduction gear and auxiliary gears for driving adjustable limit switches, light switches and position indicator. It has a wide variety of possible adaptations utilizing flexible shafting to drive small rotary or linear actuators singly or in multiples. Dimensions are only 7⅛" x 4¾" x 2¾". Weight is only 3⅜ lbs. Specifications may be varied to suit special requirements.

TYPE D-357

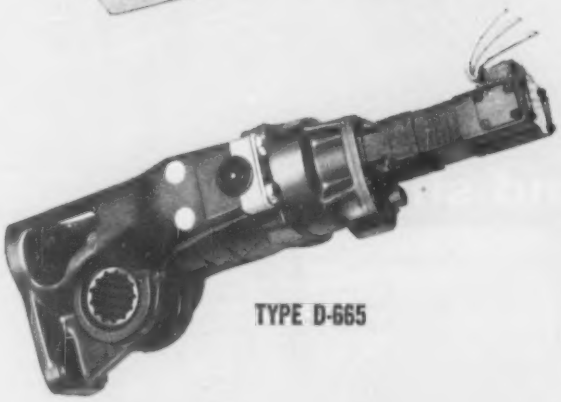
Type D-357 EEMCO-designed canopy actuator develops 50 inch-pounds at 280 R.P.M. operating on 28 volts DC in intermittent duty. Gear ratio is 40 to 1. Unit includes magnetic clutch and brake and radio noise filter. Stall torque is 300 inch-pounds maximum. Weight is 4¾ lbs.

Type D-374 EEMCO camera door actuator has dual output shafts with 175° rotation at 1 second maximum. It is equipped with adjustable limit switches, radio noise filter, magnetic clutch and brake. Output is 280 inch-pounds of torque on each shaft. Gear ratio is 441 to 1. Weight is 8¾ lbs.



TYPE D-374

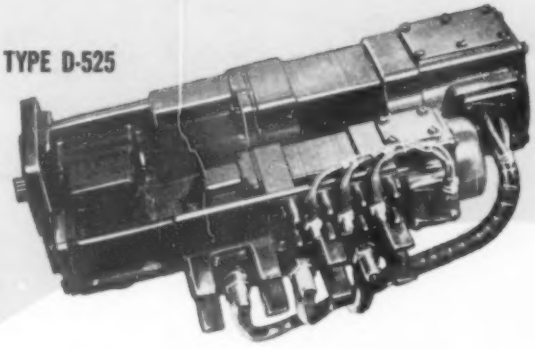
Type D-665 Designed as a trailing edge actuator for jet fighters. It has a normal peak load of 28,000 inch-pounds and a total angular travel of 30°. Speed is .675 R.P.M. with an average load of 14,000 inch-pounds on a 28 volt DC system (18.75 amps). Ultimate static load is 77,000 inch-pounds. Weight is 25½ lbs. Design incorporates auxiliary power take-off and non-jamming end stops.



TYPE D-665

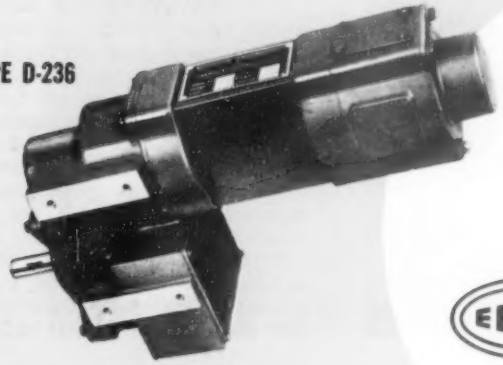
Type D-525 Double motor power unit for horizontal stabilizer of turboprop aircraft. Consists of small 1/15th h.p. continuous duty motor operating through a gear reduction for trimming in automatic flight, and a large intermittent duty 3½ h.p. motor with direct drive of 12,000 R.P.M. for manual operation. Dimensions of complete unit are 12½" x 7" x 3¾". Weight is 16½ lbs.

TYPE D-525



Type D-236 A rotary actuator for intermittent duty, delivering 200 inch-pounds at 107 R.P.M. on 24 volts DC. Unit includes magnetic clutch and brake, adjustable limit switch, cams, and thermal protector. Gear ratio is 28 to 1. Weight is 8½ lbs.

TYPE D-236

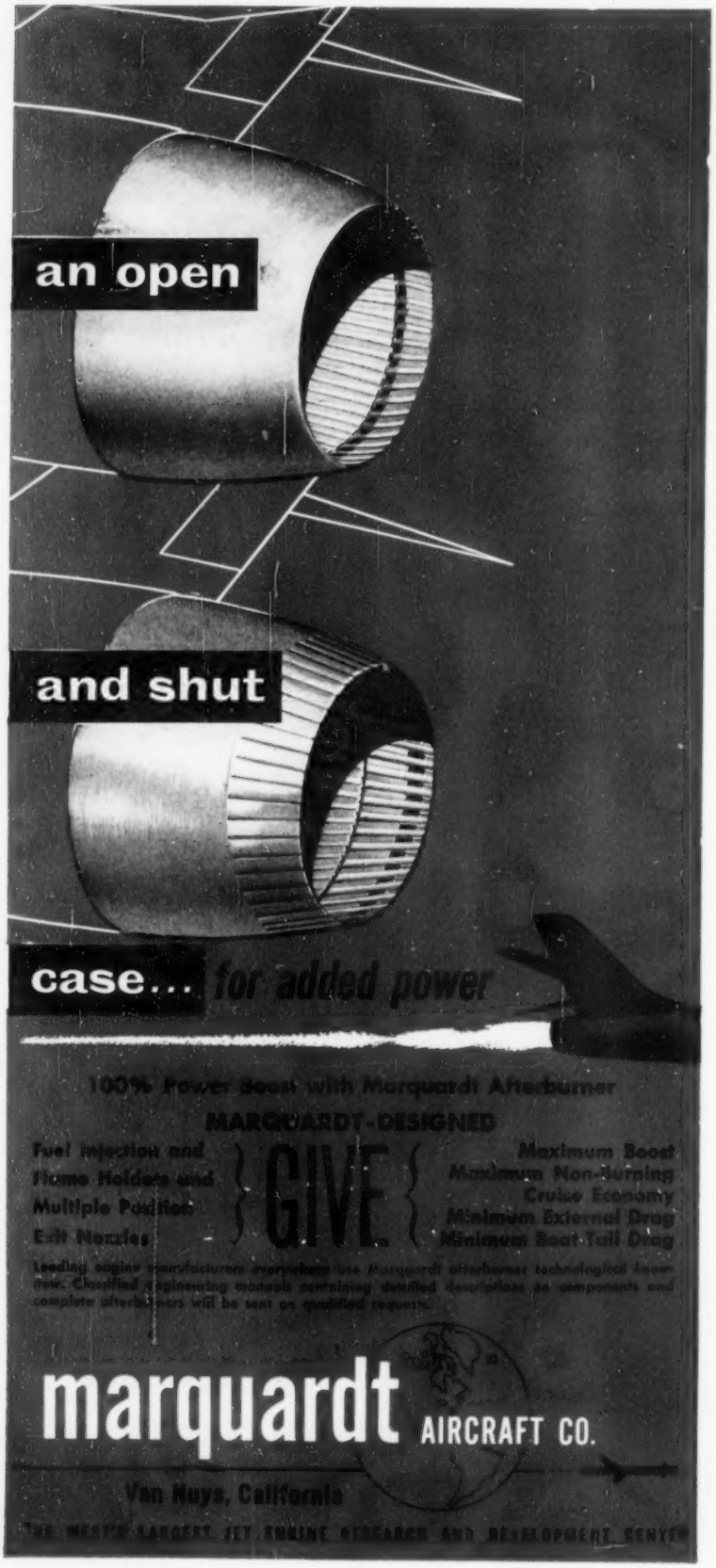


Designers and producers of motors,
linear and rotary actuators

Electrical Engineering and Manufacturing Corp.

4612 West Jefferson Boulevard, Los Angeles 16, California

EEMCO can supply a rotary actuator to fit *your* specifications


an open
and shut
case... for added power
100% Power Boost with Marquardt Afterburner
MARQUARDT-DESIGNED
Fuel Injection and
Flame Holders and
Multiple Position
Exit Nozzles
GIVE
Maximum Boost
Maximum Non-Burning
Cruise Economy
Minimum External Drag
Minimum Boat-Tail Drag
Leading engine manufacturers everywhere use Marquardt afterburner technological know-how. Classified engineering manuals containing detailed descriptions of components and complete afterburners will be sent on qualified requests.
marquardt AIRCRAFT CO.
Van Nuys, California
THE WEST'S LARGEST JET ENGINE RESEARCH AND DEVELOPMENT CENTER

seat dummy struck the instrument panel with his head as the collapsing forestructure moved toward him. A dummy in the rear seat struck his head on the back of the front seat, then settled back into normal seating position. This indicated that the seats must permit a head blow without causing severe head injury.

▶ **Specs Established**—NACA's overall research findings led to establishment of design requirements for passenger seats safely to take loads imposed during a crash landing. Included in the seat specifications were provisions that the seat should be:

- **Strong enough** to hold the passenger in place.
- **Capable of enough elastic deformation** to absorb the shock of peak loads, but incorporating considerable frictional damping so as to prevent any elastic rebound.
- **Able to withstand shocks** from any direction, because a crash-landed plane may swing around and hit objects while moving sideways or rearward.
- **Constructed of such materials** so that if breakage occurs no sharp or pointed objects will endanger passenger.

▶ **Seat Characteristics**—To determine whether these specifications could be met within the space and weight limitations required in aircraft use, an experimental seat was built for study under crash conditions. The seat incorporates these features:

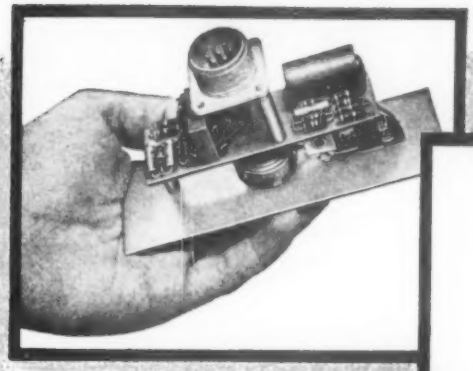
- **Seat back,** side arms and seat-pan are air-inflated members free from structural metal parts. A body or head blow against these parts is well cushioned. Since all members except the seat pedestal are air-inflated, the seat back and pan could, in an emergency, keep the passenger afloat—possibly for a period of days.
- **Rubber linkages** between the structural members give the required elasticity and ability to support a blow from any direction.
- **Friction surfaces** between structural members which move relative to each other as the seat distorts in the crash provide the necessary damping to prevent elastic rebound.

▶ **Dummy Action**—Tests with the dummy show that if the crash blow is from the front, the dummy moves forward in the seat and the seat distorts in this direction to absorb the shock of the blow.

If the crash blow comes from the rear, the dummy presses against the seat back. Under the high load against the seat back an accordion-pleated rip-out panel unfolds to allow the seat back to support the dummy in the pocket formed.

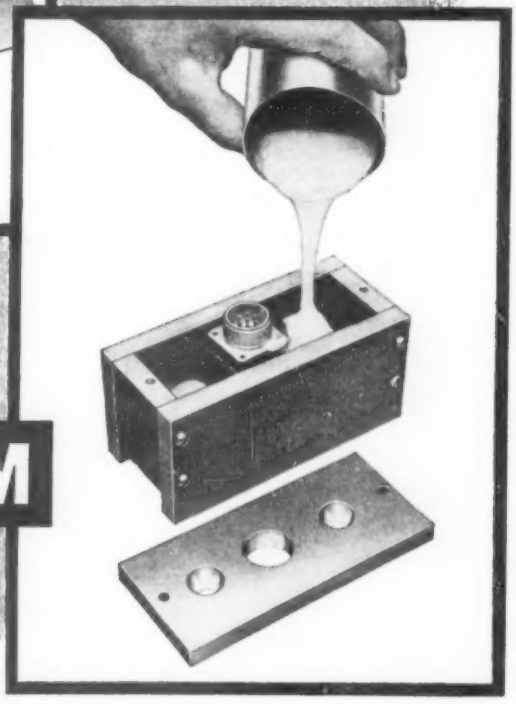
If the back of the seat remained in its original (normal) position, a passenger might slip out of his seat belt and slide rearward over the seat back.

this control needed protection

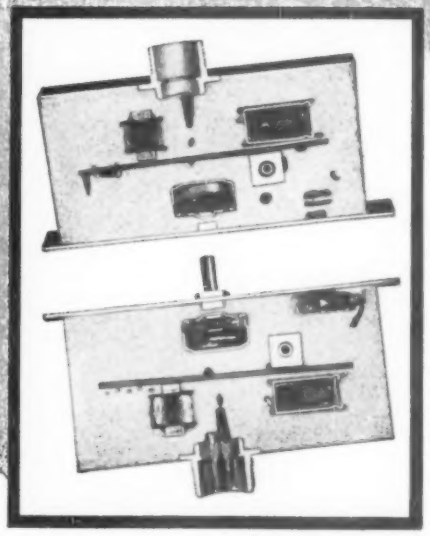


here's the easy way they protected it with

NOPCO® LOCKFOAM



result: a complete barrier against vibration, corrosion, dampness, fungi



Hamilton Standard Division, United Aircraft Corporation, needed a potting material for the electronic temperature control unit that governs cockpit air-conditioning—found Nopco Lockfoam ideal for the purpose.

Nopco Lockfoam is indeed ideal for this and many other similar tasks because of the absolute protection it affords against damage from severe vibration. Its light-weight closed-cell structure makes a tamper-proof assembly, and gives a high impermeability to dampness, corrosion, and fungi growth. Also, its pour-in-place technique effects great economy of assembly time.

Further, each of the 50 different formulations available is highly consistent and reproducible.

Perhaps the rare combination of properties of this versatile plastic can help with some product *you* have in mind. *Write today for the Nopco Lockfoam booklet.*

Where Can YOU Best Use These Properties?

- Near-perfect Radar Transmission
- Ease of Fabrication It's "poured-in-place"
- Great Strength with Light Weight
- Excellent Electrical Properties 6 lb/cu ft Lockfoam tested at 9.375 KMC Dielectric Constant 1.05 Loss Tangent .0005
- Good Thermal Insulation "K" Factors .018 at 8 lb/cu ft to .025 at 11 lb/cu ft
- Wide Range of Densities From 2 to 35 lb/cu ft
- Great Versatility 50 different formulations available

Plastics Division

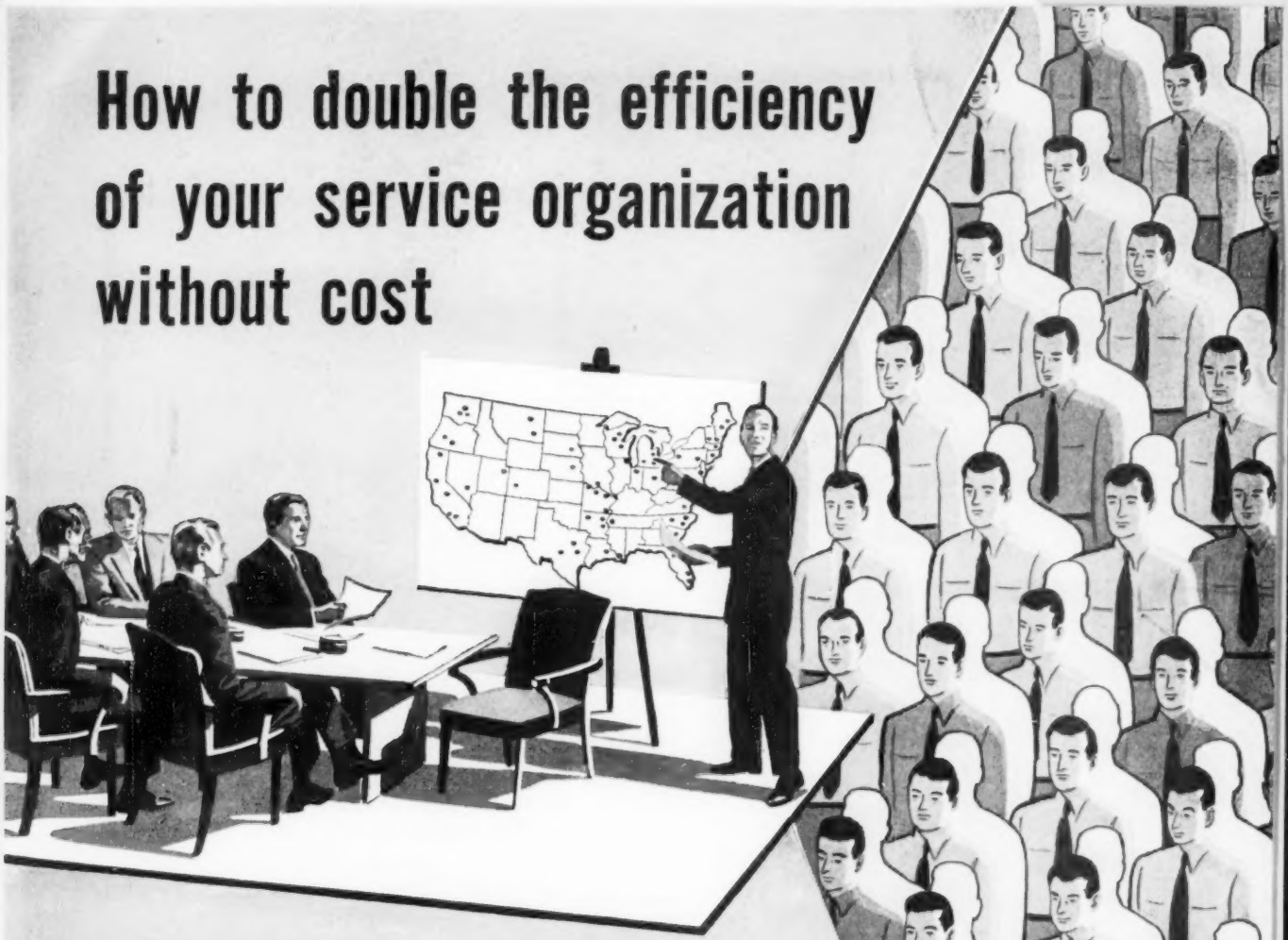
NOPCO CHEMICAL COMPANY

Harrison, New Jersey

4858 Valley Blvd., Los Angeles 32, Calif.

NOPCO TRADEMARK EVOLVED THRU RESEARCH

How to double the efficiency of your service organization without cost



When engine builders or air frame manufacturers specify Bendix* for their fuel metering, landing gear or brake requirements, they are assured not only of the finest quality products but have at their command one of the best trained and efficient service organizations to be found in the aircraft industry.

Every member of the Bendix Products service staff has been thoroughly schooled in the latest methods of efficient maintenance procedures and is trained to work with customers from installation to ultimate replacements. Thus, the original quality and performance built into every Bendix product is delivered at all times.

Like all members of the Bendix Products organization, the service staff is made up of men who are specialists in the fields of fuel metering, landing gear, wheel and brake equipment. Having met and mastered service troubles for all types of planes and operating conditions, these service specialists can help immeasurably in building good will for engine builders and air frame manufacturers thru preventive maintenance that will assure lower operating costs.

Any way you look at it, for the best in research, engineering, manufacturing or *service* in the fields of fuel metering, landing gears and brakes, it pays to insist on a specialist—and the Bendix Products service organization has been a specialist in these fields for over thirty years.

*REG. U. S. PAT. OFF.

BENDIX PRODUCTS DIVISION **SOUTH BEND** INDIANA

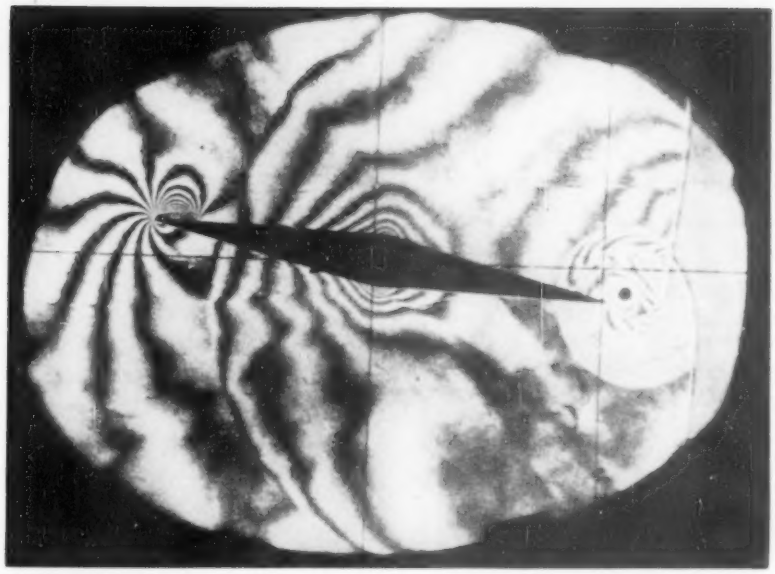
Export Sales: Bendix International Division • 205 East 42nd Street, New York 17, N. Y.

Bendix Products Division

Past performance is the best assurance of future achievement!

Cermetallic brake lining, developed by Bendix Products engineers, has revolutionized all previous standards of braking efficiency. With this fundamentally different brake lining, braking capacity has been increased 50%, lining life is five times longer and delining and relining are accomplished in half the time.

Here is another outstanding example of Bendix creative engineering ability.



INTERFEROGRAM of flow in shock tube shows complex eddying set up by shock wave passing over double-wedge airfoil section. Flow is from left to right.

Shock Tube Used as Windtunnel

The use of a shock tube as a short-duration windtunnel to study blast effects on aircraft makes up part of Project Locus, a study conducted by the Dept. of Aeronautical Engineering, Massachusetts Institute of Technology.

Usual use of the shock tube is to study the mechanics of shock waves, but Profs. R. L. Bisplinghoff and H. G. Stever believe that the MIT unit may be the only one in this country with the "windtunnel" feature.

The shock tube can simulate transient flows around aircraft up to a Mach number of about 1.5, which includes the critical transonic region. This is in addition to its primary use as a source of high-intensity shock waves for the purpose of studying blast effects.

►**Description**—The MIT shock tube is about 98 ft. long and one foot square, made of ¾-in. steel plate. The tube is divided into two sections by a sheet of film.

One end of the shock tube is pressurized; the other end can be pumped out towards vacuum to increase the pressure ratio across the film. A remote-control knife punctures the film and the shock forms when the flow starts down the tube.

Duration of steady-state flow over the model is only about 0.040 sec., long enough to permit a series of electronically timed highspeed pictures to be taken of the flow.

Project Locus, financed by the Air Research and Development Command, USAF, is a study to determine the effects of blasts on flying aircraft, and to find out how close to a bomb blast a plane can fly without structural damage.

'Sky Compass' for Polar Navigation

A new "Sky Compass" for accurate acrial navigation in polar regions above 70 deg. laitiude has been developed by the Kollsman Instrument Corp.

The Elmhurst, N. Y., manufacturer says the Sky Compass determines an aircraft's true heading by finding the position of the sun when it is below the horizon. It does this by using the polarized light in the sky when the sun is not visible. This is particularly important in the far north and south regions because of the protracted twilight periods when the sun is below the horizon. Twilight also obscures planes and starts normally used as visual references in celestial navigation.

The Sky Compass includes a specially designed optical system which incorporates an analyzer. This component includes a polarizing plate and a half-wave plate. The latter has cut-outs to produce a pattern visible in the optical field. The instrument also has an illuminated bubble and a true heading objective.

The compass is periscopic in design, very similar in appearance to the periscopic sextant which Kollsman has produced for several years for the world's airlines and the military.

Advantage of the periscopic design is

7 reasons why Pacific Accelerometers

are the first choice of careful engineers

These Humphrey design Pacific Accelerometers offer

1. Maximum accuracy with clear, sharp signals
2. Long life, designed for 1000 hour continuous use
3. Excellent repeatability and noise-free performance
4. Minimum sensitivity to cross talk
5. Unique internal design combined with sealed case
6. Built for exacting requirements of air-borne computers and fire control systems
7. Proper damped natural frequency to eliminate jitter and error in readings

Send today for the complete bulletin

Pacific SCIENTIFIC CO.

1430 Grande Vista Ave., Los Angeles 23, Calif.
25 Stillman Street, San Francisco 7, California
1915 1st Avenue South, Seattle 4, Washington
111 East Main Street, Arlington, Texas
EASTERN REPRESENTATIVE: AERO ENGINEERING INC.
Mineola, L.I., N.Y., • Indianapolis • Baltimore • Ottawa

We proudly present the

Californian

WESTERN AIRLINES DC-6B

Champagne Flight

BETWEEN CALIFORNIA AND THE PACIFIC NORTHWEST

Enjoy these extra luxuries at **no extra fare...**

- ★ **Sparkling Champagne** *(with Western's Compliments)*
- ★ **Filet mignon dinner**
- ★ **Orchids for the ladies**
- ★ **Reserved seats**
- ★ **Super-pressurized 4-engine DC-6B**

ARCTIC NAVIGATION AID tells direction by polarization of sun's light.

that only a very small part of the instrument protrudes into the airstream, causing practically no additional drag, Kollsman says. Also, the danger of blown-out astrodomes is avoided, it is claimed.

To operate, the navigator rotates the Sky Compass as he looks through the eyepiece. The light intensity in the various portions of the pattern in the analyzer varies until the Sky Compass is pointed towards the sun's azimuth. When this happens, the pattern disappears and the optical field becomes a solid grey—a condition known as the "match point." Then the navigator reads the aircraft's true heading from the scale.

Kollsman says that an advantage of the Sky Compass is that the analyzer pattern, bubble image, and true heading scale are all visible in the optical field. This enables the navigator to check all three simultaneously and get his true heading quickly and accurately.

Hiller Erects Barrier For Jet Test Noise

The jet engine whirl-test stand at Hiller Helicopters, Palo Alto, Calif., is shrouded with a large sound barrier and muffler system to maintain a low noise level during test runs.

Standing about 18 ft. high and with a diameter of about 40 ft., the insulated structure was designed by Hiller's industrial engineering personnel in conjunction with Owens-Corning's Fiberglas Division sound control engineers. It was constructed by Aro & Okerman, Palo Alto.

Lower half of the wall is comprised of two wood sides with 3 ft. of dirt fill between. Upper portion of the barrier, also a double wall, has a Fiberglas blanket as the insulating material.

Because of the technical problems

SOUND BARRIER for Hiller test stand.

concerned with the intake of air for the jets, it was not feasible to build a completely enclosed circular barrier, it is reported, hence the barrier was positioned to provide shielding for the populated areas, with the open end pointed toward San Francisco Bay.

THRUST & DRAG

Eighty books from the "Reading List for Young Engineers" have been placed for loan in the headquarters building of all engineering society activity in the Cincinnati area. This is a part of a pilot-study program to determine what aspects of community life can be of assistance to young engineers during the first few years following graduation.

The books cover almost any subject in the arts and humanities; they include Balzac's "Droll Stories" and Marx's "Capital" and Twain's "Tom Sawyer."

This is a commendable step in the liberal education of an engineer and it has only one disturbing aspect: the fact that it was necessary in the first place.

Why should an engineer have to be urged to improve his humanistic background? Why must a committee have to recommend the books he should read? Why have the engineering schools missed the boat so completely in teaching more than engineering?

* * *

McDonnell Aircraft Corp.'s John H. Meyer, chief of structures, airplane branch, said this about weight saving at the recent summer meeting of the Institute of the Aeronautical Sciences:

"At McDonnell we have come to the conclusion that weight saving is quite important to fighter airplanes, and have established a criterion for its importance as follows:

(a) In engineering, we can spend up to 50 man-hours design time to save a pound on a given design, all other things being equal.

(b) In manufacturing, we can spend up to 10 man-hours per pound for each airplane, all other things being equal."

* * *

Let's nominate for oblivion a dog-tired old cliche from the engineering presentation. Let's sell Topsy down the river.

For years, you and I have been listening to speakers say that their organization "just growed, like Topsy." At that point, word association takes over and for the next few seconds I see the ol' plantation and the ice floes and hear the belling bloodhounds. By the time I shake off the magnolia petals, the speaker has gone on and is winding up for the finale. I've missed the in-between.

There are all sorts of better—even more colorful—phrases to describe the random growth of engineering organizations, and I for one would like to hear them, instead of the bloodhounds and the churning river. **—DAA**

GIANT PRESSES
and tiny tubes . . .
all a part of Kaman
The production of Kaman helicopters requires large plant facilities, an impressive inventory of machine tools and equipment . . . and men. From technical men devoted to the research, design and development of aerodynamic, mechanical, electronic, and electro-mechanical devices and systems to production craftsmen skilled in the art of metal working. All are part of Kaman, and each helps explain the universal acceptance of Kaman Performance.
Booklet on request.
NAVY
KAMAN
THE KAMAN AIRCRAFT CORPORATION • BLOOMFIELD, CONN.

AVIATION WEEK presents the

AUGUST 16, 1954 THE

WORKING WITH the editorial cooperation of the USAF Air Materiel Command, Aviation Week's editors are preparing their most important publishing assignment of the year . . . the August 16 Air Materiel Command Edition. Editorial offices at Wright-Patterson Air Force Base, Dayton, Ohio are humming with activity as teams of Aviation Week editors collect the latest available information and data on 1955 Air Force Procurement and weave together the complete story of this major Air Force Command.

KEY EDITORIAL EFFORT is being concentrated on covering new policies and ground rules of AMC and its revised relations with the aircraft industry . . . spelling out new regulations and complete information on how to best do business with the government. Other editorial sections will be devoted to Air Force industrial mobilization plans, spares provisioning policy, and industry's new

complete story of AIR FORCE PROCUREMENT

AIR MATERIEL COMMAND EDITION

role in Maintenance and overhaul programs. Research and Development procurement will be featured in a special report.

COMPLETE DETAILS on Fiscal 1955's Air Force Procurement Program as well as complete Command organization data and buying information will establish the unmatched usefulness of this Air Materiel Command edition in the Aviation Industry, the Air Force and the Government. In addition, this issue will provide a valuable tool in the government's everlasting search for new sources of manufactured products, materials and services.

CURRENTLY, AMC holds over $16 billion in contracts awarded. More than 14,000 different firms are AMC prime contractors, and AMC inventories list more than 1,250,000 separate items. Approximately 100,000 AMC employees transact this huge business volume, with civilian employment far outnumbering military. AMC expends more dollars annually than General Motors, Standard Oil of New Jersey, American Telephone and Telegraph, Ford, Bethlehem Steel, General Electric, Union Carbide, Chrysler, Westinghouse, U. S. Steel and duPont combined . . . provides aircraft and equipment maintenance on a scale ten times larger than all domestic airlines combined.

MORE THAN 50,000 ENGINEERS, aviation management men, Air Force, Military and Government Officials will have a copy of this issue on August 16, 1954. Make sure your company is represented in the Air Materiel Command Edition. Write—or wire—your advertising reservation to:

BUSINESS MANAGER, AVIATION WEEK,
330 WEST 42ND STREET, NEW YORK 36, N. Y.

Look to the Sky for your Market

AVIATION WEEK

A McGRAW-HILL PUBLICATION • ABC-ABP

McGRAW-HILL PUBLISHING CO., INC., 330 W. 42ND ST., N. Y. 36, N. Y.
Other Advertising Sales Offices: Atlanta, Ga.; Boston, Mass.; Chicago, Ill.; Cleveland, Ohio; Dallas, Tex.; Detroit, Mich.; London, Eng.; Los Angeles, Calif.; Pittsburgh, Pa.; Philadelphia, Pa.; San Francisco, Calif.; St. Louis, Mo.

New Inventions

Government Offers Patents for License

New patents issued recently on inventions assigned to the U. S. in the field of aircraft and parts have been reported to AVIATION WEEK by the Government Patents Board.

They are listed below in a reader service that will appear as the Board provides the abstracts.

These inventions are available for license, ordinarily on a non-exclusive, royalty-free basis, on application to the agency indicated in the abstract. Printed copies of letters patent may be obtained from the Commissioner of Patents, Washington 25, D. C., at 25 cents a copy, payable by check or money order. Specify by title and patent number when ordering.

▶ DIFFUSER APPARATUS WITH BOUNDARY LAYER CONTROL. Patent No. 2,674,845, issued Apr. 13, 1954.

An exhaust gas diffuser for a jet motor comprises a hollow fairing cone supported on hollow struts radially disposed within an outer cylinder wall and positioned in the afterburner section of the motor. The cone has boundary layer air bleed apertures which communicate through the fairings with discharge outlets formed in the struts so that the air may be returned to the main body of motive gases at a point remote from the critical flow surfaces of the cone. Inventor: Walter D. Pouchot. Administered by the Patent Counsel, Department of the Navy, Washington 25, D. C.

▶ ROCKET PROPULSION UNIT WITHOUT SEPARATE GAS GENERATOR FOR TURBOPUMPS. Patent No. 2,676,456, issued Apr. 27, 1954.

A pump assembly for a rocket propulsion unit comprises a pump having turbine blades and means to drive the blades by the gases from the main rocket chamber of the rocket motor, the gases passing into and through the mixing chamber before reaching the pump turbine. The mixing chamber is connected to the delivery side of at least one pump to deliver at least one of the liquid propellants from the pumps into the mixing chambers to reduce the gas temperature therein. Inventor: Hans T. Holzwarth. Administered by the Chief, Patents Branch, Office of the Judge Advocate General, Department of the Air Force, Washington 25.

▶ COMBINED ROCKET AND JET PROPULSION. Patent No. 2,676,457, issued Apr. 27, 1954.

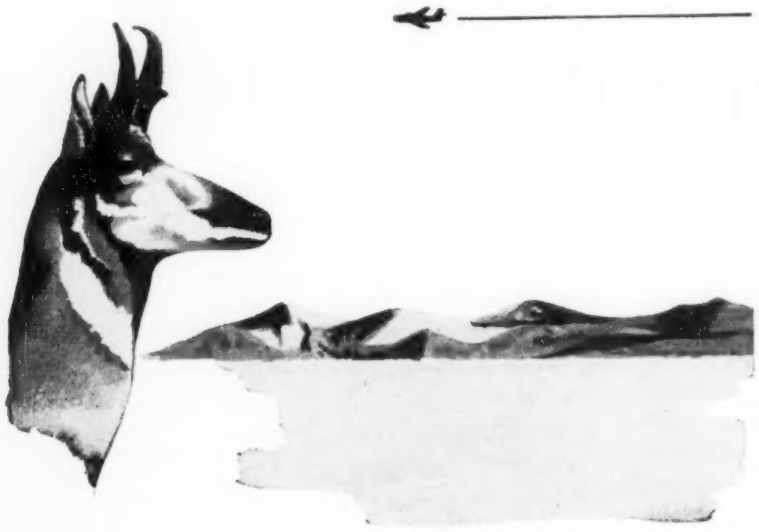
A combined rocket and jet propulsion motor for aircraft comprises a gas turbine having an annular jet nozzle the inner wall of which is defined by a conical tailpiece. A rocket motor is positioned within the conical tailpiece and so arranged as to discharge its jet through an opening provided at the apex of the tailpiece. Air from the intake passes through a compressor and then into a combustion chamber, and the hot gases are then directed by guide vanes against the blades of a turbine disc. The exhaust gases flow over the tailpiece and join the jet discharged from the rocket unit. Inventor: Fred S. Kramer. Administered by the Patent Counsel, Department of the Navy, Washington 25, D. C.

▶ CORROSION-RESISTING COATING. Patent No. 2,676,942, issued Apr. 27, 1954.

A corrosion-resisting coating for metal, such as aircraft control cables, comprises a mixture of vinylmethacrylate resins in low boiling solvents, a plasticizer and a corrosion inhibitor. A typical composition comprises by weight 100 parts of a copolymer of vinyl chloride, vinyl acetate and maleic acid, 40 parts N-butyl methacrylate polymer, 33 parts of polyethylene glycol di-2-ethyl-hexoate as a plasticizer, 5 parts zinc potassium basic chromate dissolved in a mixture of xylol, toluol and methyl isobutyl ketone. Inventor: Alfred L. Glass. Administered by the Patent Counsel, Department of the Navy, Washington 25, D. C.

▶ FLIGHT TRAINER. Patent No. 2,671,970, issued Mar. 16, 1954.

A flight trainer for aircraft pilots comprises an index representing a model aircraft, a model maneuver area translatable in respect to the index, a trainee's station having simulated aircraft controls for causing motion of the maneuver area to simulate an aircraft flying in the area and an optical system to permit the trainee to view the area from the index. Inventor: Otto H. Schmitt. Administered by Patent Counsel, Department of the Navy, Washington 25.



a wide range of aircraft steels

An unequalled range and tonnage of aircraft quality alloy and stainless steels are as close to you as your nearby Ryerson plant—and ready for immediate shipment. These carefully protected stocks include:

ALLOYS—Over 400 sizes, finishes and kinds of alloy bars, sheets and strip to aircraft specifications.

STAINLESS—Over 300 sizes, shapes and types of aircraft quality stainless steels.

Also standard specification steels—thousands of kinds, shapes and sizes in carbon, alloy and stainless analyses. So for quick delivery of *any* kind of steel . . .

call RYERSON

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA CHARLOTTE, N. C. • CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

MORE AIRPLANE-AT YOUR PRICE

All-Metal—4-Place—Now

ONLY $8295

More Than Ever, Your Best Buy in the Low-Price Field!

Here it is! America's *only* 4-place, all-metal airplane in the low-price field—the beautiful 1954 Cessna 170. Eleven all-new features. Cruises at over 120 m.p.h.! Smooth, quiet 6-cylinder engine is highest-powered in low-price field. Smart new interior and exterior colors and trim. More airplane than ever . . . yet the price has been *lowered* to $8295!

Cessna 170 AIRCRAFT COMPANY

Ageless All-Metal

Cessna 170 is the only airplane in the low-price field that offers you the strength and safety of all-metal construction. Stays beautiful for years, requires no maintenance.

Only Cessna 170 Offers You These "Extra Value" Features in the Low-Price Field

"PARA-LIFT" FLAPS for short, slow landings, quick take-offs.

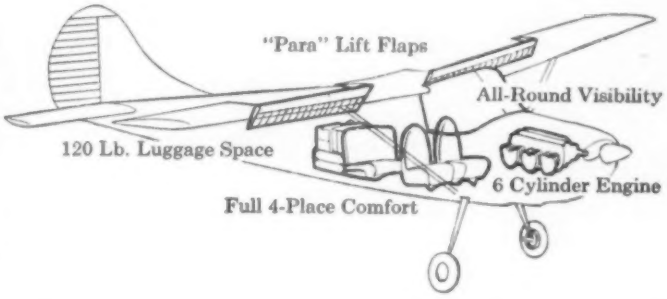
FULL 4-PLACE COMFORT with 120 lbs. luggage—or—2-place with a quarter ton of cargo.

BEST ALL-ROUND VISIBILITY . . . both over-the-nose and in flight. Compare it with any other airplane!

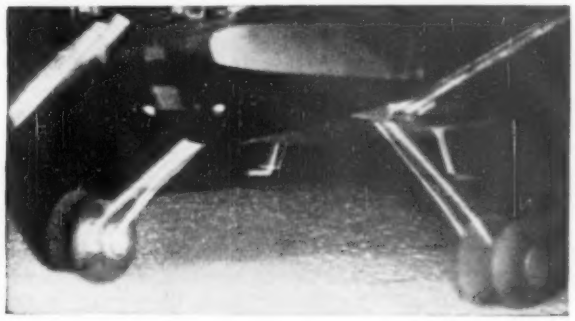
BEST HEAT and VENTILATION. Fresh warm air or fresh cool air to every passenger. Living room comfort at all altitudes, in all seasons!

6-CYLINDER ENGINE, more cylinders than any other airplane engine in the 170 price range!

ALSO: Flush-riveted wing struts . . . windshield defroster . . . easier-to-use trim tab wheel . . . improved instrument panel . . . foam-rubber seats . . . two yard-wide cabin doors.



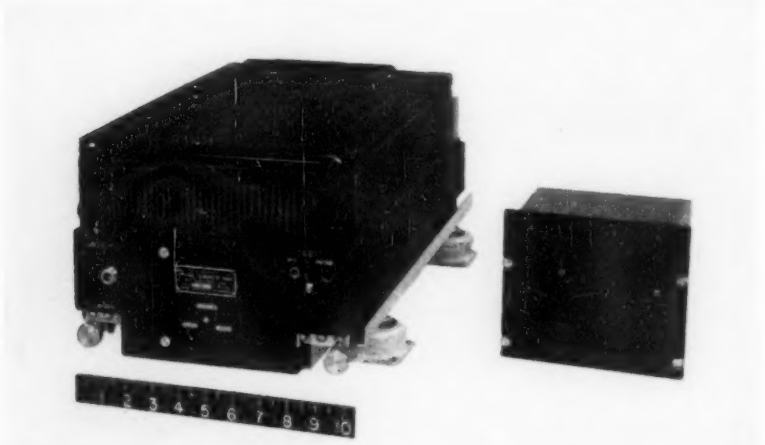
World's Safest, Smoothest Landing Gear



It "Flexes" To Absorb Shock

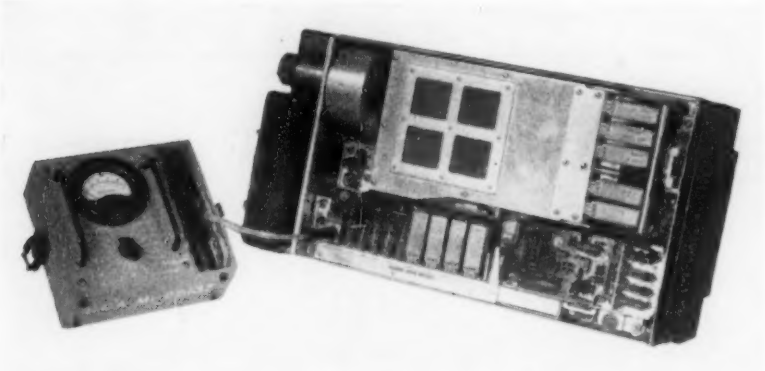
Superimposed high-speed photographs show how Cessna's exclusive landing gear flexes upward and outward to absorb the shock of rough-field landings and take-offs, provides a smoother ride for passengers, reduces strain on all parts of the airplane. No maintenance is required because there are no moving parts to wear out. For more information on Cessna airplanes, see nearest Cessna dealer (listed in yellow pages of telephone book) or write Cessna Aircraft Co., Dept. AW-4, Wichita, Kansas.

New UHF Transceiver Ideas Pay Off



NEW 1,750-CHANNEL UHF TRANSCEIVER developed by RCA, to be standard equipment on all new USAF aircraft, is 40% lighter, 50% smaller than predecessor.

UNITIZED CONSTRUCTION employed throughout the ARC-34 permits subassembly replacement without tuning or alignment, using only a screwdriver.



FAULT-FINDING TESTER ISOLATES TROUBLE to major subassembly by providing convenient means of measuring significant voltage and currents.

• AF finds maintenance problems reduced by field test of pilot quantities, simplified design.

By Philip Klass

Dayton—First report on Air Force's new UHF transceiver, the AN/ARC-34, indicates that pre-production field testing of pilot quantities, use of unitized construction, and built-in fault-isolating provisions have paid off in reduced maintenance time, cost, and less skill required of GI maintenance personnel.

USAF's experience shows: "Lowest echelon maintenance personnel . . . who normally check plugs and tubes, could do the next higher echelon maintenance (on the ARC-34) and, in some cases with a little help, the very highest echelon of maintenance," despite the fact that the ARC-34 was new and unfamiliar equipment. This was reported by G. H. Scheer, a branch chief in the Wright Air Development Center's Communications & Navigation Lab, to the recent airborne electronics meeting at Dayton.

▶ **Developed by RCA**—The new ARC-34, developed by Radio Corp. of America, is a 1,750-channel, remotely controlled command communications set covering the 225-to-400-mc. band. Any 20 of its 1,750 frequencies can be preset and selected in flight from a single knob. The set weighs 53 lb. (including remote tuning control), and occupies a volume of one cubic foot. This is approximately 40% lighter and 50% smaller than previous UHF transceivers, Scheer says.

The older Collins AN/ARC-27 UHF transceiver, developed by the Navy and used until recently by both services is mounted in a pressurized container for high-altitude operation. This imposes some size and weight penalty. The ARC-34, while not pressurized, can deliver full power up to 50,000 ft., RCA says.)

▶ **How It Was Achieved**—The notable record of the ARC-34, Scheer said, is the result of a new production philosophy and two engineering philosophies employed in its design:

• **Pre-production field test,** under operational conditions, of pilot quantities built with production tooling.

• **Unitized construction throughout,** with each subassembly designed to permit replacement without any adjust-

ments and without sacrificing overall equipment performance.

• **Fault isolating provisions,** including a simple "go, no-go" tester which can be plugged in to locate faulty subassemblies.

▶ **Most Significant**—Possibly the most significant innovation was the decision to produce 150 pre-production ARC-34s with production tooling prior to plunging into a full-scale manufacturing program. The entire batch of ARC-34s was installed on jet fighters at a single eastern air base where WADC and RCA engineers could keep close watch on performance and shortcomings.

This controlled field test was the first of its kind ever attempted by the C&N lab and may possibly have been the first ever attempted by any WADC lab, Scheer told AVIATION WEEK. This experiment "proved that there is no substitute for proving out a new equipment in the environment in which it will be used, by many different pilots, in many airplanes," Scheer said.

▶ **Design Changes Easier**—Development samples, which are subjected to extensive bench and flight testing, are seldom just like the article which will be produced in quantity, Scheer pointed out. Design changes suggested by field or manufacturing experience are difficult to introduce if full-scale production is underway, involving extensive backfit modification programs and disrupting manufacturing operations.

The ARC-34 controlled field test "has proven its value in terms of the design changes which have resulted to date," Scheer said. "Some actually would have required rework in the field. Others represent improved manufacturing methods and techniques. All of them will represent very significant savings to the military services over and above the cost of this first production," Scheer added.

This has prompted other WADC labs to follow suit on new complex equipments which they are readying for production, Scheer said. He believes the technique should be employed whenever the time schedule will permit it.

▶ **Added Unitization Hurdles**—To take fullest advantage of unitized-type construction, not in itself new, the C&N lab imposed some added requirements in the ARC-34. Each major assembly had to be designed so it could be plugged in as a replacement without any adjustments, and this should not affect equipment performance adversely. For instance, each intermediate frequency amplifier stage is a completely self-contained, pre-tuned, plug-in unit, eliminating alignment problems.

Each major assembly had to be removable with only a screwdriver. Gears, splines and mechanical couplings had to be designed so as not to require any special positioning, other than to engage them.

▶ **Fault Isolation**—RCA designed each major subassembly so that a tester could be plugged in for speedy checking of vertical voltages and currents, selected by the rotary switch on the tester. Limiting values for each check are posted on a chart in the tester cover. As a result, "a person with practically no training can immediately determine the faulty subassembly," Scheer said.

One penalty of unitized construction, inaccessibility of individual components, is overcome by patch cables which RCA supplies. These allow subassemblies to be pulled out, yet electrically connected to the main chassis and operated for high-echelon trouble-shooting.

▶ **Answer to Growing Complexity**—Scheer is hopeful that the approach used in the ARC-34 program is at least a partial answer to the problem of growing complexity in military communications equipment. One example of this growing complexity: World War II AN/ARC-1 communications set had only 10 channels; ARC-34 has 1,750, which requires complex frequency synthesizer circuitry.

The greater the complexity, the higher the skill required for maintenance, the greater the cost of maintenance training, and the fewer the qualified personnel available to do the maintenance, is the way Scheer sums up the problem.

Maintenance costs have reached the point, Scheer said, where the military spends eight to 10 times the original cost of an equipment to keep it operating during its lifetime.

▶ **New USAF Standard**—The ARC-34 is slated to become the standard UHF equipment on all new USAF aircraft, and may be used to replace the ARC-27 on existing fighters and interceptors where space and weight are a critical problem.

Following are a few of the technical highlights of the ARC-34, based on data released by RCA:

• **Channel spacing:** 100 kc.
• **Channel stability:** 10 kc.
• **Power output:** 8 watts minimum.
• **Approximate range:** Up to 250 miles air-to-ground; up to 550 miles when used air-to-air.
• **Receiver sensitivity:** 5 microvolts or better with 10-db. signal-plus-noise to noise ratio produces output of 0.8 volts or better across 150-ohm load.
• **Channel selection time:** No more than 4 sec.

The ARC-34 has a separate guard channel for transmission and reception of emergency messages. Guard channel receiver has its own RF and IF sections, but shares the audio amplifier of the main receiver.

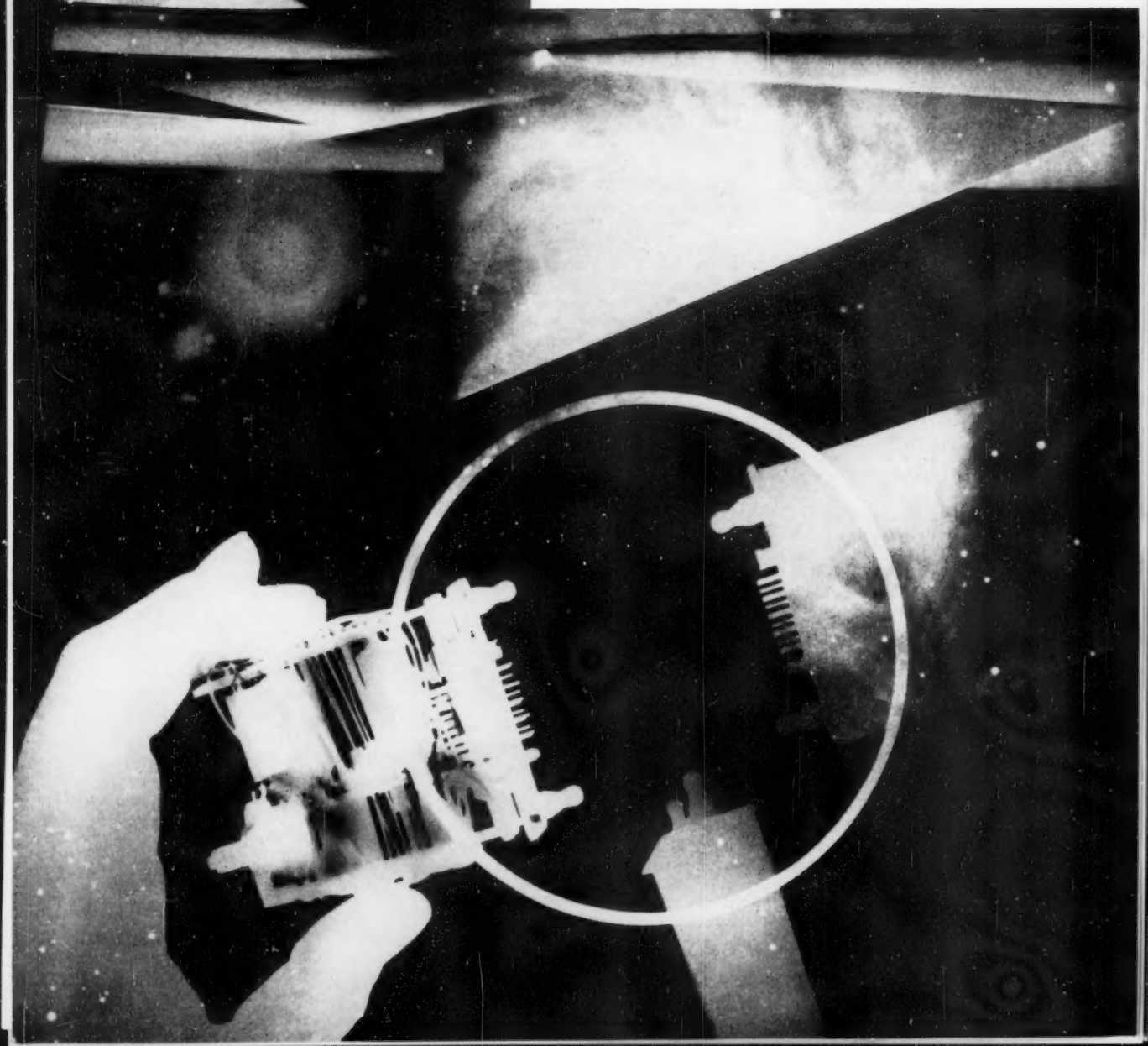
Hecker has been designing and building tools for the aircraft industry since 1931, specializing in jigs, fixtures, transport dollies and master tooling. We offer a complete service from tool design through tool building to finished production parts all in one plant. We invite your inquiries and will be pleased to send further information.

Designers and Builders
Tools • Jigs • Fixtures • Special Machinery
Manufacturers of Machined Metal Parts

SINCE 1931
A. W. Hecker CO.
7200 EUCLID AVENUE
CLEVELAND 3, OHIO

TOMORROW'S AIRCRAFT: *One step closer*

Air Arm Systems "package engineered" for installation and maintenance



Quicker installation and easier maintenance . . . important plus-features for airborne electronics equipment are a reality at Air Arm. The basic Air Arm approach to *all* electronic problems, combined with inherent ingenuity and capability, has led to concepts such as pallet packaging, encapsulated and functional circuitry, built-in test points . . . to mention just a few.

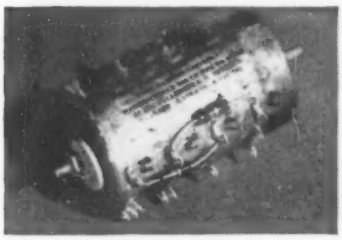
Applying these concepts to all Air Arm systems gives outstanding features . . .

- 100% accessibility
- compatibility with aerodynamic design
- weight and space reduction
- self-contained shock isolation
- simplified airframe design and construction

MAGAMPS, potted units and other proven developments for weight and size reduction are a basic part of the new packaging concepts. Electronic circuits are physically combined and integrated into compact subassemblies—each of which has a single major function. Thus, over-all packages are made up of functional units of complete systems.

This "package-engineering" results from intense Air Arm development and close Air Arm association with the special problems of airframe design and operational requirements. Such achievements in electronic-mechanical design are typical of Air Arm's efforts to bring simplicity and increased reliability into airborne systems, thus bringing tomorrow's aircraft—One Step Closer. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-91019



MAGAMPS typify the "package-engineering" which Air Arm applies to airborne systems. Simple and reliable as iron and copper, they are a rugged replacement for vacuum tubes. Wherever such packaging is used, maintenance is reduced, circuitry is simplified and systems are far more dependable.

The most advanced state-of-the-art is always brought to bear in Westinghouse design, evaluation and improvement of airborne systems. For example, human engineering studies help technicians perform tasks quickly, simply and surely—thus building the greatest amount of dependability into the system.

Jet Propulsion • Airborne Electronics • Aircraft Electrical Systems and Motors • Wind Tunnels to Plastics

YOU CAN BE **SURE**...IF IT'S

Westinghouse

Makers Report New Measurement Devices

A new vacuum-tube voltmeter, designed for use over a frequency range of 10 cps. to 4 mc., is one of several recently announced voltage and phase measuring devices suitable for laboratory use. The new Model 400D can measure voltages of 0.1 mv. to 300 v. in 12 selectable ranges, is reportedly accurate to within 2% up to 1 mc. Input impedance is 10 megohms. Manufacturer is Hewlett-Packard Co., Dept., P., 395 Page Mill Road, Palo Alto, Calif.

Other new measurement devices:

• **Low-frequency phase meter,** covering range of 0.0001 cps to 1,000 cps., can reportedly measure phase between two voltages to within 0.5 degree, gives a digital-type readout on five decade counters. Manufacturer: Advance Electronics Co., 451 Highland Ave., Passaic, N. J.

• **Vacuum-tube electrometer,** Model 210, a d.c. voltmeter with input impedance greater than 10^{14}, grid current below 10^{-13}, and drift within 10 nv./hour, according to Keithley Instruments Co. Unit has five voltage ranges: zero to 0.8, 2, 8, 20, and 80 volts, either polarity. New meter also can function as a d.c. preamplifier for recorders and oscilloscopes, with quoted frequency response of 0 to 5,000 cps. Company address: 3868 Carnegie Ave., Cleveland 15, Ohio.

• **Phase meter,** Type 322-A, measures phase angle to within one degree, or changes in phase angle to within 0.1% over frequency range of 20 to 20,000 cps., or up to 1 mc. with slightly higher errors. Input signal range is 2-30 v. Technology Instrument Corp., Acton, Mass.

Avionic Literature

Recently announced bulletins and data sheets describing devices and techniques of interest to persons in the avionics field include:

• **Germanium diodes,** Type 1N, 2-page catalog and data sheet. Bulletin N-1. International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.

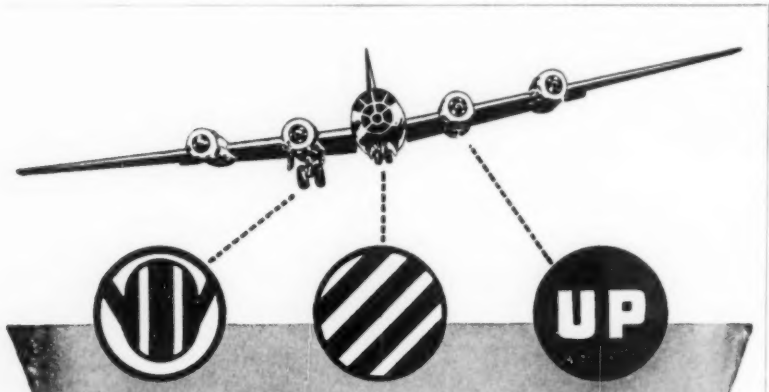
• **Printed circuit production** problems and techniques. Bulletin 106, 4 pages. Insulated Circuits, Inc., 115 Roosevelt Ave., Belleville, N. J.

• **VOR (omnirange) systems,** both 50 watt and 200 watt, including technical specs. (12 pp.). Collins Radio Co., Cedar Rapids, Iowa.

• **Circuit breaker engineering guide,** 24-pages, describes their application. Heinemann Electric Co., 278 Plum St., Trenton 2, N. J.

• **High-frequency resistors,** Type MP, application data on 43 types. Bulletin F-1. (8 pp.). International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.

• **Precision test instruments,** including recording oscillographs, galvanometers, amplifiers, analog computers, function generators. (4 pp.). Wm. Miller Instruments, Inc., 325 N. Halstead Ave., Pasadena 8, Calif.

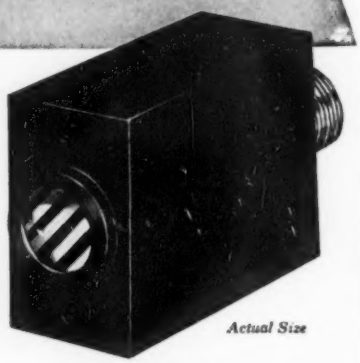


Three "pictures" tell the tale . . . Simply, Accurately!

KEYSTONE
3-POSITION INDICATOR

Requires but a Small Space —Gives a "BIG PICTURE" on Operating Conditions

The landing gear markings shown above are but *one* of *eleven* different instrument applications. Tells the story "at a glance" on *flap positions, oil pressure or temperature, fuel supply* and other operating conditions. Economical, easy-to-install in both small and large planes.



Actual Size

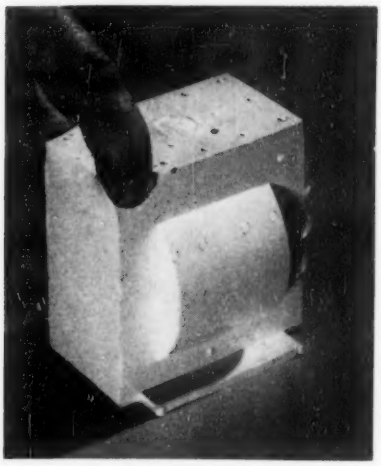
High Quality Construction

- Impervious to dust, moisture, gases
- Hermetically sealed brass case
- Filled with inert gas
- Optically clear glass window
- Corrosion resistant finish

RIVERSIDE

For additional information, write to:

KEYSTONE WATCH CASE DIVISION
RIVERSIDE METAL CO.
Riverside, New Jersey



Dielectric Jacket

This transformer is coated with Silastic S-2007, new resilient encapsulating material. Designed for avionic components, Silastic S-2007 reportedly has twice the thermal conductivity of conventional resinous or rubber dielectrics, according to Dow Corning Corp. Transformers coated with S-2007 meet moisture resistance and low temperature flexibility specs of MIL-T-27, Grade 1. It cures in 2-4 hours at 200C.

FILTER CENTER

► **New Pioneer Autopilot for YC-133**—Eclipse-Pioneer's new PB-20 autopilot, an advanced design for highspeed aircraft (AVIATION WEEK Dec. 28, 1953, p. 11), is slated for the Douglas YC-133 turboprop. Company says this is the first USAF equipment contract awarded under the modified weapons system procedure which enables equipment and aircraft manufacturers to work directly with each other, with AF acting as monitor, to provide more flexibility during pre-production phase of the program.

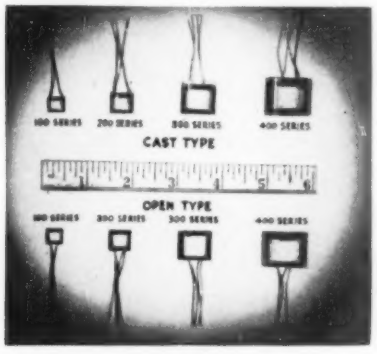
► **New Gyro Proves Out**—Summers Gyro reports that its new PAR (position and rate) gyro has successfully stabilized a Radioplane KD2R-3 target drone at Pt. Mugu, Calif., Naval Air Missile Test Center. Summers says it initiated the test to answer skepticism in some quarters about the new device, which consists of a rate gyro and an integrating motor. (AVIATION WEEK Dec. 14, 1953, p. 71).

► **Zeroing Aircraft Charge**—A system for maintaining zero (or an arbitrary value) electrostatic charge on an aircraft in flight has been developed and tested by Cornell Aeronautical Lab, under contract to Air Force Cambridge Research Center. The system, described by CAL's Frank M. Pelton at the recent Dayton avionics conference, consists of two electrostatic field sensing elements in the wing tips, a discharging point in the tail and a variable high-voltage supply to activate discharge.

► **New Marker Beacon Report**—"Minimum Performance Standards (for) Airborne Radio Marker Receiving Equipment Operation on 75 Mc." is the title of new report by Radio Technical Commission for Aeronautics Special Committee No. 58. Identified as Paper 87-54/DO-57, report can be obtained for 30 cents from RTCA Secretariat, 1724 "F" St. N.W., Washington 25, D. C.

► **Ryan Active In Avionics**—Growing activity of Ryan Aeronautical Co. in the avionics field is shown in company's report that it is manufacturing limited quantities of an airborne navigational system for Navy and is developing guidance systems for USAF. Ryan also makes the avionic equipment for its Firebee target drone and recently obtained a BuAer contract to develop an airborne helicopter hovering device (AVIATION WEEK June 7, p. 7).

► **Gremlins Get ECA?**—In our article, "Transport Copters Need New Nav-Aids" (July 12, p. 48), printers' gremlins dropped the word "No" from a sentence, making it appear that GCA equipped with MTI has difficulty "seeing" a hovering helicopter. The reverse is true, of course, as the equipment filters out ground clutter and picks up the copter's rotating blades. —PK



Tiny Transformers

Tiny transformers for transistor circuits, encapsulated or open, are available in four types (input, output, interstage, or chokes), rated from under one milliwatt to over 100 mw. All models are rated for operation in temperature range of —25C to 100C. Manufacturer is Texas Instruments Inc., 6000 Lemmon Ave., Dallas 9, Tex.

AIRCRAFT SENSENICH PROPELLERS

...for complete dependability and superior performance

Designers and pilots alike know that, for outstanding service, it's *best* if it's a *Sensenich*. For proof of this popularity remember—more personal planes are equipped with Sensenich propellers than any other make!

Fixed Pitch
METAL
CAA approved up to 135 hp.

Skyblade
CONTROLLABLE
CAA approved up to 165 hp.

Fixed Pitch
WOOD
CAA approved up to 225 hp.

TEST CLUBS
up to 3000 hp.
Write for bulletin and price list

Dept. W, Sensenich Corp., Lancaster, Pa.

Sensenich PROP SHOP ... prompt propeller repair of all makes fixed pitch Wood, Sensenich, Hartzell, Beech Controllable, Metal or Wood; Sensenich and McCauley fixed pitch Metal. Magnaflux, etching, anodizing and plating service.

SKIN PANEL ALLOWABLES INCREASED WITH 75 ST *hi-shears*

75ST HI-SHEAR rivets combat "head popping" and wrinkles in skin panels more effectively than 24ST DD rivets. Combining higher material strength and close tolerance heads, the 75ST HI-SHEARS permit higher shear and tension allowables, reduce shop problems and improve surface flushness.

HS25

rivers with the AN426 styled head permits countersinking in skin minimum thickness of .072 or more. Hole preparation is accomplished with same standard tools.

HS23

with the small HI-SHEAR styled head permits countersinking in thin gauges (.051 min.) and eliminates sub-countersinking or sub-dimpling in frame-to-skin attachments, extrusions, stainless steel, titanium or where dimpling clearances are lacking.

HS26

with a flat head attaches thin sheets where bearing is critical. Reduced by ⅔rds the weight of a steel fastener.

- 75 ST HI-SHEARS drive with ½ the force of DD rivets and eliminate "ice-boxing" DD rivets.
- 75ST HI-SHEARS use the same standard Sets as used in driving steel HI-SHEARS.
- 75ST rivet pin uses an A17ST HS24 collar (dyed blue).

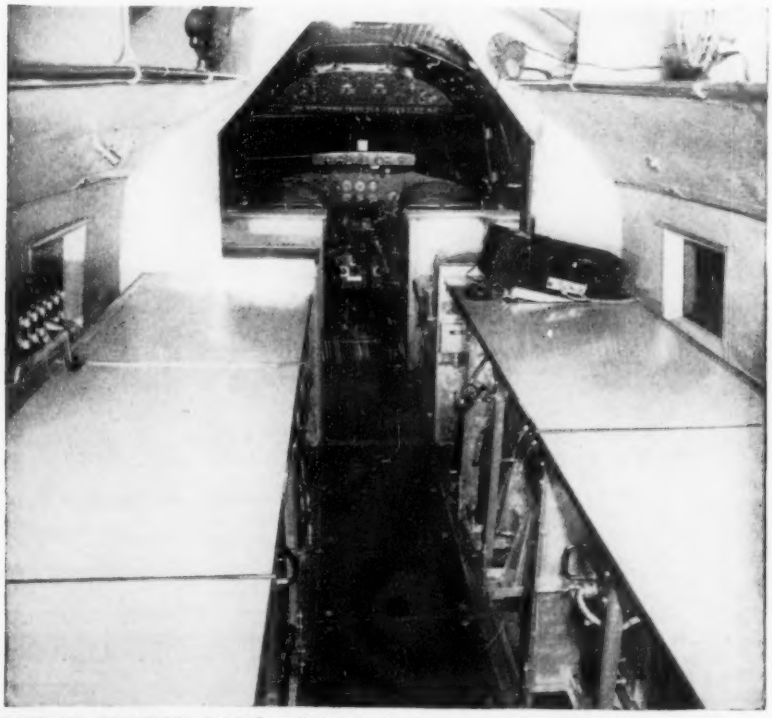
WRITE for the HI-SHEAR Standards Manual.

U. S. and Foreign Patents—Trademark Registered

THE *hi-shear* RIVET TOOL CO.
8924 BELLANCA AVENUE
LOS ANGELES, CALIF.

'Flying Showcase' Sells Bendix Products

REFURBISHED DOUGLAS DC-3 is inflight demonstrator for Bendix Aviation products.



DISPLAY COUNTERS behind cockpit are 13 ft. long. Power outlets are provided so exhibits can be operated wherever feasible. Products are changed for specific audiences.

Miami—On a flight down here from Teterboro, Bendix Aviation Corp. showed this writer its "Flying Showcase," an ex-UAL DC-3 that the company uses to display its airborne wares.

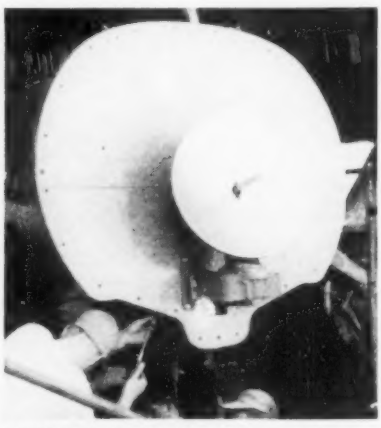
The Bendix RDR-1 airborne radar was in full operation during the flight. The thunderstorms forecast for the Jacksonville-Daytona, Fla., area did not materialize, so there was no opportunity to demonstrate the equipment's weather warning ability. However, in its second job—terrain mapping—it did a fine job, showing rivers and coastline clearly on the long-persistence cathode ray tube. The RDR's antenna is mounted in the nose in a radio-transparent, optically opaque radome. It scans the area in front of the plane at a rate of 15 rmp. The set incorporates three sweep ranges—20, 50 and 150 mi.

A hood that snaps on the front of the scope protects it from bright sunlight. The scope is ceiling-mounted on a swivel so it can be turned easily for use by either pilot, the flight engineer or an observer.

A servo motor tilts the antenna through a range of plus 15 deg. to minus 15 deg. The antenna is stabilized against pitch and roll of the aircraft to a maximum of 20 deg. Angular displacement information is taken from the plane's autopilot, or, when no autopilot is aboard, from a separate gyro.

Other equipment on display in the Flying Showcase:

• **Course-line computer,** installed the evening before this flight. This laboratory-new computer "makes an omni station out of any desired point on the map," say Eclipse-Pioneer personnel



ANTENNA for RDR-1 airborne radar was installed by Remmert-Werner employes.

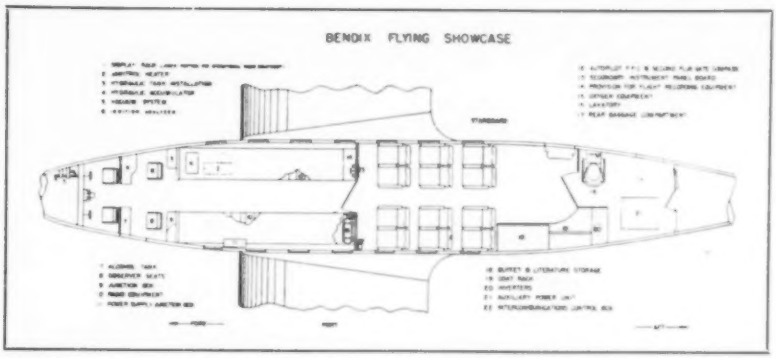


DIAGRAM shows layout of DC-3 used to display products of various Bendix divisions.

AFT PASSENGER CABIN for 12 includes demonstration flight panel on starboard side.

RDR-1 AIRBORNE RADAR system indicator is mounted on swivel in Flying Showcase for use by either pilot or co-pilot. Second indicator is located in passenger cabin.

Acceleration!
MEASURE IT
WITH A
GIANNINI
ACCELEROMETER
Magnetically and hydraulically damped units available. High outputs can be used to actuate recording, indicating or telemetering devices directly without amplification. Precious metal potentiometer coil and brushes used for long life and low noise. Unaffected by altitude or humidity. Will operate under conditions of high vibration. Write for information.
MODEL
Small, compact, lightweight. Oil damped, pressurized. Ranges 2.5G to 20G. Resistances 2000 ohms and 5000 ohms.
MODEL
24118
Ranges 1G to 30G. Resistances 1000 ohms to 20,000 ohms. Inert gas filled or oil filled, single or dual outputs, linear or functional.
Giannini
G. M. GIANNINI & CO. INC.
Airborne Instrument Division
PASADENA 1, CALIFORNIA

who developed it. When bearing information and distance, to destination that is offset from an omni-DME station are set into the computer, it will establish the required track to the destination. The computer turns the new destination into a reference station and the bearing to the station can be read from the radio magnetic indicator. Deviation from the desired course can be read on the usual crosspointer indicator or Omnimag. The computer is not yet in production but is scheduled for early availability.

• **Remote-reading directional gyro** indicator for executive aircraft. Instrument incorporates the same low-drift gyro used in Bendix's Polar Path compass system. It is claimed to give business and aircraft operators the same accuracies heretofore available only in military and commercial airline equipment. The system uses an autosyn synchro takeoff on the gyro to drive the panel-mounted indicator. The indicator also mounts an autosyn takeoff, so it may drive still other instruments.

• **Resin-impregnated Fiberglas bottles** for liquid oxygen, such as Bendix is providing for the Republic F-84F, Boeing B-47 and B-52, and Douglas B-66. The bottles contain liquid oxygen at −290F; the company points out that 1 cu. in. of the liquid is equivalent to 800 cu. in. of oxygen in the gaseous state.

• **PB-10A autopilot** and automatic approach flight path control.

• **Scintilla ignition analyzer.**

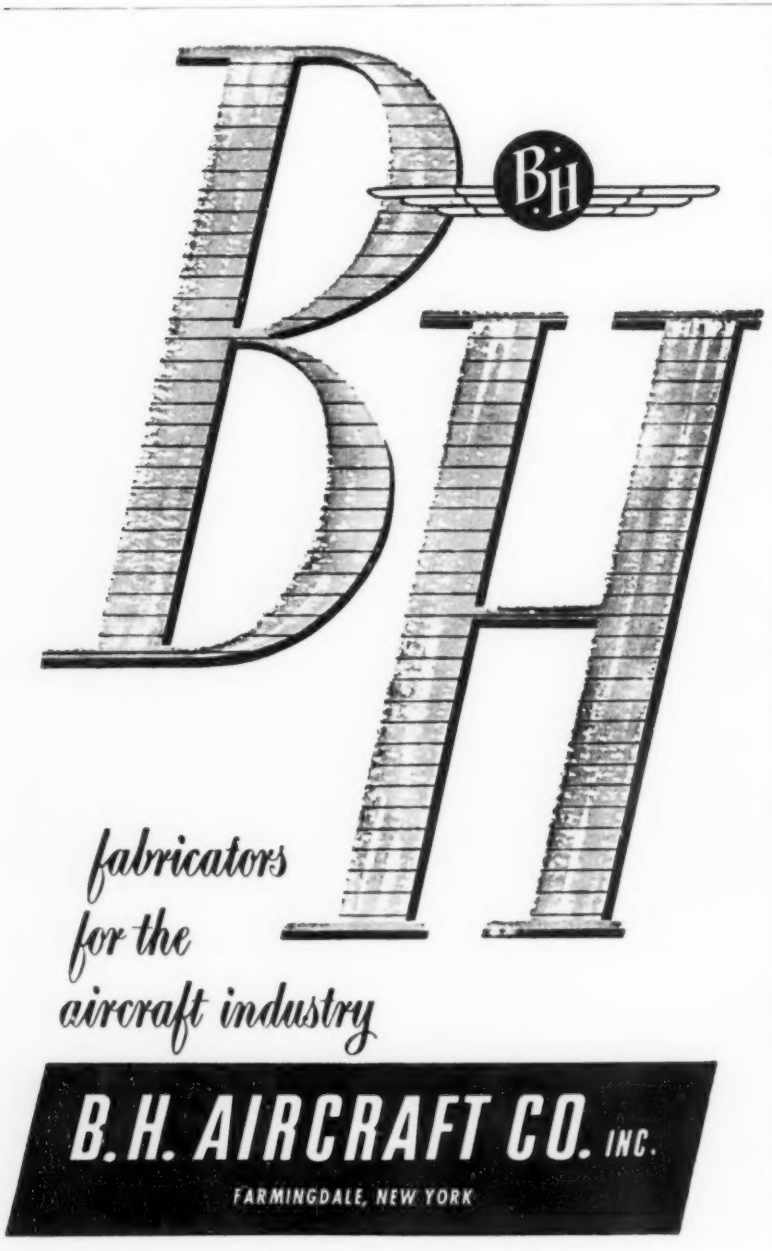
• **Engine instruments.**

• **Navigational and communications equipment.**

• **Overvoltage fault protection system.**

• **Gravimetric-type fuel flow system.**

▶ **Show Room**—The forward section of the cabin contains two 13-ft. counters, on which the products—most of them hooked up—are displayed. Then comes a bulkhead, aft of which is a 12-seat cabin with a flight panel, so passengers may observe performance —GLC



Trailer Classrooms Have Push-Out Walls

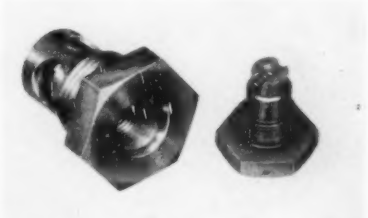
Navy is using a fleet of novel mobile classrooms with walls that can be cranked out to expand from the trailer's normal traveling width of 8 ft. to form sidewalls of a room 20 ft. square. Up to 40 trainees can be seated comfortably in the new traveling classrooms.

The units were designed and built by Trailmobile, Inc., Cincinnati, to answer the Navy's need for a unit that could provide small auxiliary naval air training bases, the same technical training advantages enjoyed previously only by larger stations.

They are used to teach munitions, ordnance and re-arming phases of aviation. The courses cover administrative ordnance, aircraft guns and accessories, ordnance electricity, fire control equipment, turrets, releasing and launching of related equipment.

OFF THE LINE

Self-sealing, magnetic drain plug assembly, made by Technical Development Co., Philadelphia, is now being handled



by Air Associates, Inc., as exclusive distributor. The plug has a spring-loaded poppet-type valve which seals off the sump when the plug is removed for inspection.

Lydda workshops of El Al, Israel National Airlines, will be taken over by Bedek Corp., a $3-million aviation repair base owned jointly by the Israeli government and a group of Americans.

To Keep Up To Date . . .

on new developments in Actionflex fiberglass-silicone laminated hose for aircraft, start your file now with this new, basic portfolio of engineering and product bulletins. It will be sent to you by return mail and future bulletins will be forwarded automatically. Just use the handy coupon.

Actionflex Division, Orchard Industries, Hastings, Michigan

Please send me ( ) copies of your new, basic portfolio of engineering bulletins on fiberglass-silicone hose for aircraft engines and airframes. Forward future bulletins as they become available.

Name _____

Company _____

Address _____

City _____ *Zone* _____ *State* _____

For the highest performance standards

The Most Trusted Name in Ignition

With its new DC-7, the Douglas Aircraft Company surpasses all of its previous achievements in setting new standards of passenger comfort and convenience.

Obviously in this latest and greatest Douglas plane there is no compromise with quality. Every component was selected for its ability to deliver the highest efficiency under every conceivable operating condition.

We of the Scintilla Division of Bendix are proud that our ignition equipment is being used on this outstanding plane which is in operation or on order by such distinguished air lines as American, United, Delta, National, Pan American, Eastern and Panagra.

SCINTILLA DIVISION OF Bendix

SIDNEY, NEW YORK

Bendix Ignition Equipment on the DC-7

- Type DLN-9 Magneto
- Distributor Assemblies
- Ignition Harness
- Ignition Coil Leads
- High Tension Coils
- Spark Plug Leads
- E.W.L. Ignition Switch
- Radio Interference Filters
- Electrical Connectors
- Ignition Analyzers

Bendix

FACTORY BRANCH OFFICES: 117 E. Providencia Ave., Burbank, Calif. • Stephenson Bldg., 6560 Cass Ave., Detroit 2, Mich. • 512 West Ave., Jenkintown, Pa. • Brouwer Bldg., 176 W. Wisconsin Ave., Milwaukee, Wisc. • American Bldg., 4 S. Main St., Dayton 2, Ohio • 8401 Cedar Spring Rd., Dallas 19, Texas

Panagra

EXPORT SALES:
Bendix International Division, 205 East 42nd St., New York 17, New York

Wright Uses X-Ray for Alloy Studies

• Fluorescence technique slashes time needed for quality control analysis of aviation metals.

Curtiss-Wright Corp. reports that chemical analysis of aviation alloys is accomplished much more speedily by complementing the usual wet chemical methods with non-destructive instrument techniques, such as X-ray fluorescence and optical spectroscopy.

A typical analysis of Nimonic 90 is now finished in 4 hr. instead of 19 hr.; Nimonic 80 is done in 4 hr. instead of 14. The main saving comes through application of X-ray fluorescence, C-W points out.

Samples of several different alloys now are analyzed by the quality control lab using this method. Studies are being made to adapt many more materials to the technique.

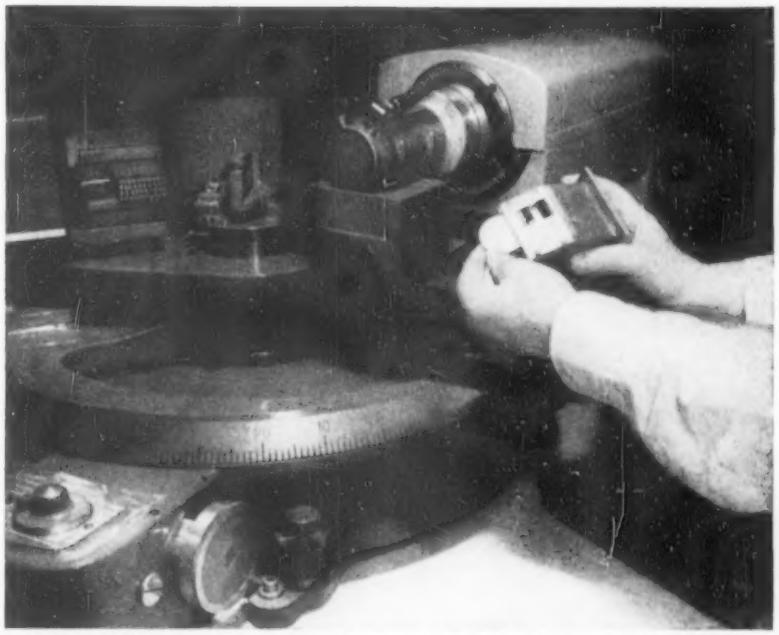
▶**How It Works**—The X-ray fluorescence method involves bombarding a sample of metal with X-rays of such wave length that a fluorescent spectrum is emitted by the sample. Each wave length in the spectrum corresponds to an element in the sample; the intensity of each wave length is proportional to the amount of the element present in the alloy. Intensity is measured by Geiger counter.

Standard calibration curves are obtained by bombarding samples of known composition that cover the concentration ranges expected in the unknowns. By comparing the unknowns with standard curves, concentration may be determined with accuracy high enough for quality control purposes. C-W finds that day-to-day reproducibility of results is good.

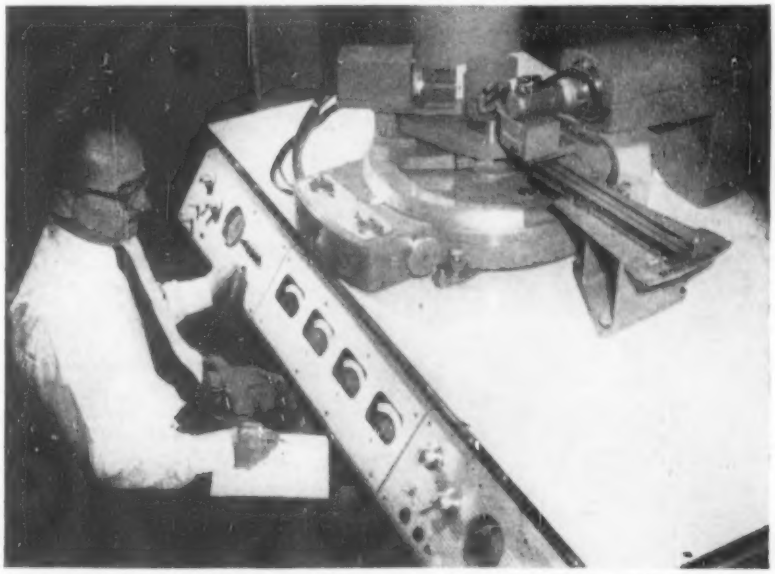
▶**Limitations**—At the present time, C-W analyzes only iron, chromium and cobalt in its Nimonic 80 and 90 by means of X-ray fluorescence. One reason is that the technique is effective only with elements whose atomic number is above 22 and in concentrations from 0.10% to 30%. Special helium chambers are necessary for analysis of elements whose atomic number is below 22, so optical spectroscopy is preferred in that range—the C-W lab uses optics for its aluminum and titanium. Carbon, manganese, silicon and sulfur are checked by wet chemical procedures, which are relatively simple and fast for these elements.

Curtiss-Wright points out that Nimonic 80 and 90 are fairly complex alloys. As a result their complete analysis encompasses the three techniques of X-ray fluorescence, optical spectroscopy and wet chemistry. In the case of alloys where the X-ray technique could be used alone, the time saving afforded by the method would be especially striking, the company indicates.

The equipment shown in the photos above is supplied by the General Electric Co. Curtiss-Wright quality control engineers point out another maker of X-ray fluorescence units is the North American Phillips Co., located in Mt. Vernon, N. Y.



METAL SAMPLE is readied for X-ray fluorescence analysis of makeup at Curtiss-Wright.



OPERATOR READS INTENSITY of emitted wave length on dial fed by Geiger counter.

INGENUITY

STANDARD LINK EQUIPMENT!

It requires the combined special skills of hundreds of Link Engineers to devise and help produce the most proficient simulated flight training equipment known.

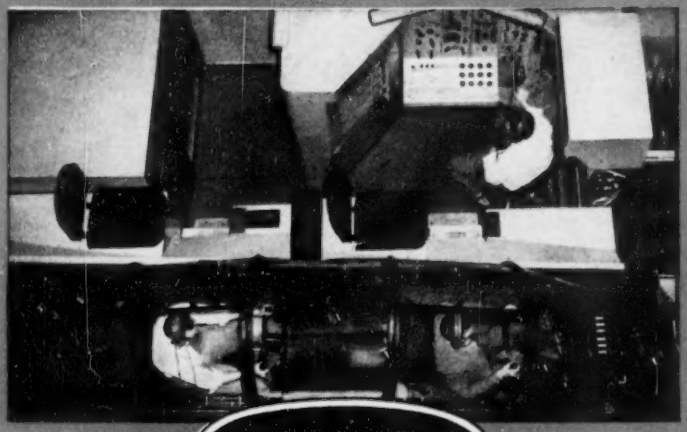
FROM THIS

small, high precision gear box which fits comfortably in the hand . . .

TO THIS

B-47B Jet Flight Simulator which occupies as much as 500 square feet, uses more than 1,000 vacuum tubes, consumes 35 kilowatts of power and utilizes more than 35 miles of wire . . . yet performs with the precision of a fine watch. . .

Link Engineers achieve *perfection* in *production!*



LINK AVIATION, INC. BINGHAMTON, N. Y.

15 YEARS OF SIMULATED FLIGHT

LINK invites employment applications from engineers and draftsmen.

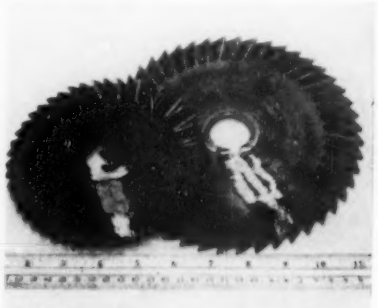
FIXTURE holds cracked milling cutter for welding. Note groove (upper right).

Welding Saves Cracked Cutters

Milling cutters, costing from $30 to several hundred dollars, are returned to operation at Temco Aircraft Corp., Dallas, the same day they are damaged. Temco uses a welding technique developed at the plant.

The rehabilitation takes a few special fixtures, welding equipment and an above-average welder.

- The pieces are lined up on a surface-ground boiler-plate fixture, secured with C-clamps, then tacked down in two places using a No. 680 Eutectic Welding Alloys Corp. No. 680 electrode.
- The cutter is placed on a 7x¼-in. Carborundum wheel. Here a deep groove is ground along the cracks on both sides of the cutter to give a good weld.
- The cutter is placed into another fixture made of two steel rings, cut from 10-in. o.d. pipe, which are tightened by means of four ½x4-in. bolts. Four smaller bolts attached to steel cross-pieces in each ring are screwed tight against the cutter.



WELDED CUTTERS are ready for service after repaired areas are ground down.

• Both fixture and cutter are preheated to about 700 deg. Welding is done with the 680 electrode. Between tacks, the work is heated with a No. 7 tip on an oxygen-acetylene torch. Completed welds are ground flush with the cutter surface.

The welding operation takes about one-half hour, excluding setup and preheat time.

▶ **Success Hints**—Here are some safeguards against further cracking of cutters during welding:

• Weld from the hub of the cutter to the cutting edge.

• Keep the weld balanced on both sides of the groove and maintain the arc as close as possible to the groove's center.

• Get the torch flame on the work immediately after each tack is made.

• Weld briefly at one extremity of the crack, then at the other to avoid "pull" at any one point.

USAF Contracts

Following is a list of recent USAF contracts announced by Air Materiel Command.

Jack & Heintz, Inc., Cleveland 1, control panels, 2,830 ea., $810,762; 2500 VA motor generators, $1,042,761; motor generator, 2,000 ea., $976,000; generators aircraft, 102 ea., $114,433.

Jam Handy Organization, Inc., 2821 East Grand Blvd., Detroit, motion picture project 19151, 1 ea., $36,121.

Johnson Fare Box Co., 4619 Ravenswood Ave., Chicago 40, Ill., charger gun 20 MM automatic, 1,104, $750,154.

Ketay Manufacturing Corp., 555 Broadway, New York, N. Y., true airspeed amplifiers and indicators, 165 ea., 171 ea., $111,552.

Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst, N. Y., altimeter-pressure, 362, $98,676; indicator, tachometer, 1,300, engineering data, set, maintenance data, set, $93,418; indicator, elec. tachometer, 1,881 ea., $149,401.

Lear, Inc., 110 Ionia Ave., N. W., Grand Rapids, Mich., actuator assy. and data, $95,695; B 1A indicators, 2,172 ea., K 4 Control, 1079 ea., $3,016,215.

Lisco Products Co., 631 West Elk Ave., Glendale 4, Calif., film holders, 18,182 ea., $51,923.

Lockheed Aircraft Corp., Factory "A", P. O. Box 551, Burbank, Calif., S/P 866 T-33A aircraft, $531,250.

Lockheed Aircraft Corp., Marietta, Ga., facilities, $54,670; C-130A airplanes, 20 ea., $57,200,000.

Lycoming Division, Avco Manufacturing Corp., 550 Main St., Stratford, Conn., R1820-84 spare parts for aircraft, bulk, $460,000.

Massillon-Cleveland Akron Sign Co., Massillon, Ohio, tow target, 21,488, $366,370.

Minneapolis-Honeywell Regulator Co., 2600 Ridgway Rd., Minneapolis, autopilot components E-6, $67,182.

North American Aviation, Inc., Los Angeles International Airport, Los Angeles 45, F-100C aircraft, $86,325,888.

Pastushin Aviation Corp., 5651 West Century Blvd., Los Angeles 45, tank assembly, 11,514 ea., $1,792,844.

Radioplane Co., Van Nuys, Calif., target drones, $6,427,968.

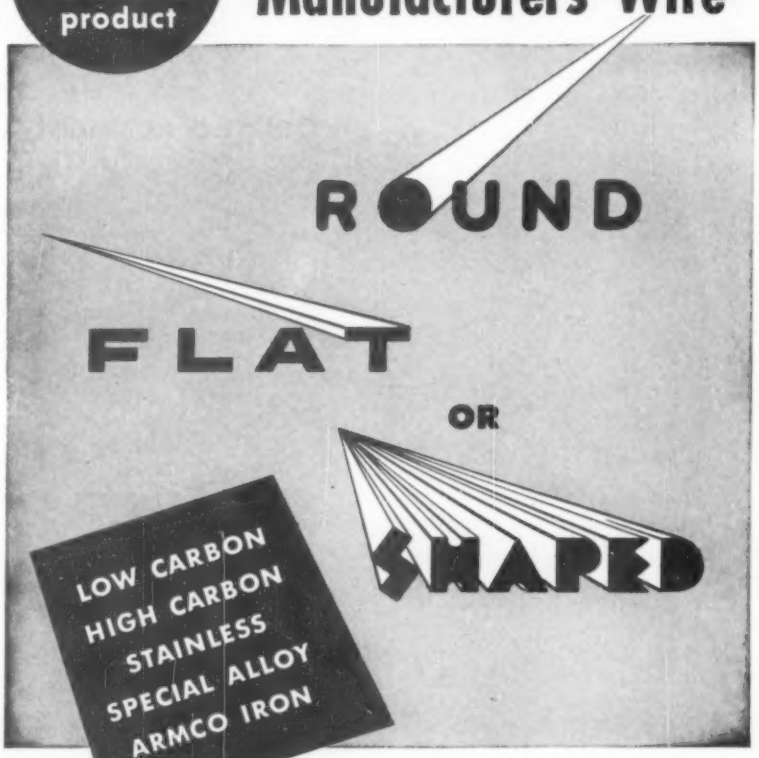
Red Bank Division, Bendix Aviation Corp., Eatontown, N. J., motor generators, $543,400.

Reynolds Metals Co., Richmond, Va., chaff, type RR/AL, 16,000 cartons, $102,240.

Royal Electric, Inc., Jamestown, Ohio, motor generators, 1,078 ea., $490,576; 636 ea., $288,565.

an ACCO product

PAGE
Manufacturers' Wire



PAGE makes them all

YOU draw the Shape...
PAGE will draw the Wire

Cross-sectional areas up to .250" square; widths up to ⅝"; width-to-thickness ratio not to exceed 6 to 1.

Tell us the way you want it. We'll follow your specifications.

Write or wire today

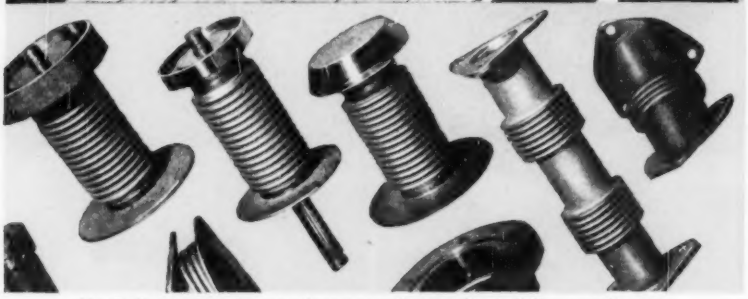
ACCO
Page Steel and Wire Division
AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

plus Welding Electrodes Wires Rods

Meet the man who aids design engineers

...on bellows assembly design problems



Mr. D. D. Gordon of our engineering staff, specialist in bellows applications.

He'll help plan a bellows assembly to answer specific requirements—wherever there's a design problem involving flexible connectors, temperature or pressure control, etc.

He'll recommend the right bellows metal. He'll know the correct bellows charge—volatile liquid or gas. He'll help on these and many more important factors to make your design plans more efficient—your products better.

Sylphon and Bridgeport bellows assemblies are used in many applications—for thermostatic devices, pressure controls, hydraulic mechanisms, expansion joints, as flexible connectors and more uses. Let our bellows application engineers, our half-century of experience and ample production facilities work for you. You'll save time, trouble and money.

SEND FOR FREE BULLETIN

Idea-filled Bulletin gives you the full story about metal bellows and bellows assemblies. Write for your free copy today. Ask for Catalog OA-1400.

Robertshaw-Fulton

CONTROLS COMPANY

FULTON SYLPHON DIVISION
KNOXVILLE 1, TENNESSEE

BRIDGEPORT THERMOSTAT DIVISION
BRIDGEPORT 1, CONNECTICUT

OVERSEAS SPOTLIGHT

Japanese Buy 2 Marathons

LONDON

The Japanese carrier, Far Eastern Airlines, took delivery of the first of two new 20-passenger Handley Page Marathons earlier this month at the British company's Reading plant. The second plane was expected to follow soon.

Fitted for FEA requirements, the four-engine transports are said to have a range of 1,330 mi. at 165 mph. Powerplants are de Havilland Gipsy Queen 70-4s, rated at 340 hp. each. Gross weight is 18,250 lb.

Heron Feederliners to India

LONDON

Indian Airlines Corp. plans to buy eight de Havilland Heron 2 feederliners soon, with the possibility of more later, the Times reports. The Heron 2s will seat 14.

In addition, the carrier is looking at transports for its longer routes between main cities. Choice will probably be either the Convair or Vickers Viscount.

Corrosion Downed Viking

JOHANNESBURG

Corrosion-triggered fatigue cracks led to fracture of a vital bolt hole in the wing of a Central African Airways' Viking transport, resulting in a crash that killed the eight passengers and crew of five Mar. 29, 1953.

A government board of inquiry found that a sudden gust of wind struck the aircraft, causing a fracture of the fatigue-weakened lower starboard boom outboard, which was rapidly followed by complete disintegration of the Vickers transport.

Corrosion must be attributed mainly to the fact that the steel bolt was not cadmium-plated, the board stated.

Naturally, Reds Have More

LONDON

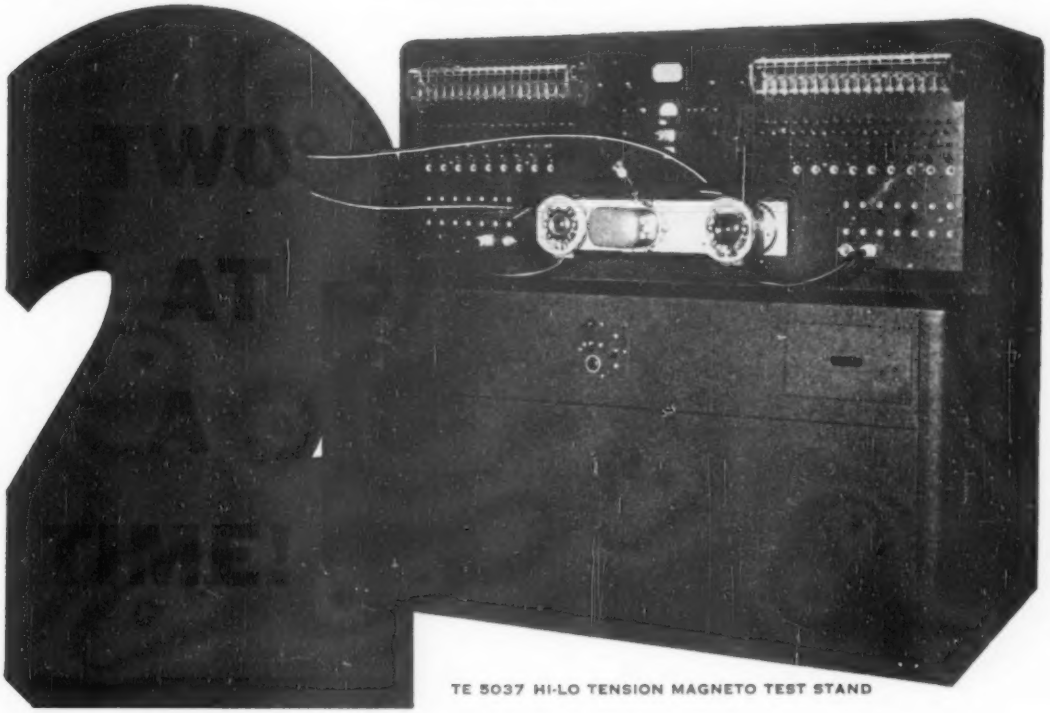
Length of Russia's internal air routes exceed that of the U. S., according to Air Marshal N. Shriko.

Flight magazine quotes a Moscow radio broadcast in which the Red marshal also stated that during the last three years of World War II, the Reds produced 40,000 planes a year.

The marshal also added a few more claims of Russian firsts: first heavier-than air flight (Mozhaisky, 1882); first outside loop (Nicolayevitch, 1913); first jet flight (by Bakhchivanzhi, in aircraft built by Bolkhovitinov, engine designed by Doushkin, 1942).

TEST ANY MAGNETO

R-985 to R-4360...hi- or lo-tension



TE 5037 HI-LO TENSION MAGNETO TEST STAND

Here's savings spelled out in dollars! Here's *one* test stand that will replace a whole shop full of miscellaneous magneto test units. *In pairs* or singly, you can test *any* magneto regardless of size...test *any* magneto whether high tension or low tension!

Finger-tip controls...handy work table area...amazing freedom from vibration... PAC's famous built-to-take-it easy maintenance construction! Modernize with a TE 5037 Hi-Lo Tension Magneto Test Stand now! You'll speed up every magneto job, you'll save money and valuable shop space, too!

Test and Handling Equipment Division

Dimensions: 5' 7½" high; 3½' wide; 6½' long.
Shipping weight approximately 1200 pounds.

Write for PAC's new Equipment brochure. It describes test and ground handling equipment that has the whole industry talking!

Pacific Airmotive Corporation

Other Divisions: Chino and Oakland, California
Seattle, Washington and Kansas City, Kansas

2940 N. Hollywood Way, Burbank, Calif.
Linden Airport, Linden, New Jersey

AMP BRINGS

AMP has grown with the aircraft industry and many of the major developments in solderless termination methods have been reached through mutual experience and cooperation in solving termination problems. AMP is proud of its unusual role in this important industry.

AMP

AMP Trade-Mark Reg. U. S. Pat. Off. © AMP

AUTOMATION TO AIRCRAFT WIRING

AMP AUTOMATIC WIRE TERMINATORS ARE THE KEY TO BETTER WIRING METHODS FOR THESE 24 MAJOR AIRCRAFT PLANTS

A.V. Roe of Canada Ltd.
Beech Aircraft
Wichita, Kansas
Canadair Ltd., Canada
Consolidated Vultee Aircraft Corp.
San Diego, Calif.
Curtis Wright,
Woodridge, N. J.
Douglas Aircraft Co. Inc.
El Segundo, Calif.
Douglas Aircraft Co. Inc.
Tulsa, Okla.
Douglas Aircraft Co. Inc.
Torrance, Calif.
Fairchild Aircraft
Hagerstown, Md.
Buick-Oldsmobile-Pontiac
Assembly Division
General Motors Corp.
Kansas City, Mo.
Hayes Aircraft Corp.
Birmingham, Alabama
Hughes Aircraft Co.
Culver City, Calif.
Lockheed Aircraft Corp.
Burbank, Calif.
Lockheed Aircraft Corp.
Marietta, Ga.
The Glenn L. Martin Co.
Baltimore, Md.
McDonnell Aircraft Corp.
St. Louis, Mo.
North American Aviation Inc.
Columbus, Ohio
North American Aviation Inc.
Fresno, Calif.
North American Aviation Inc.
Downey, Calif.
North American Aviation Inc.
Los Angeles, Calif.
Northrop Aircraft Inc.
Hawthorne, Calif.
Piasecki Helicopter
Morton, Penna.
Republic Aviation Corp.
Farmingdale, Long Island, N.Y.
Temco Aircraft Corporation
Grand Prairie, Texas

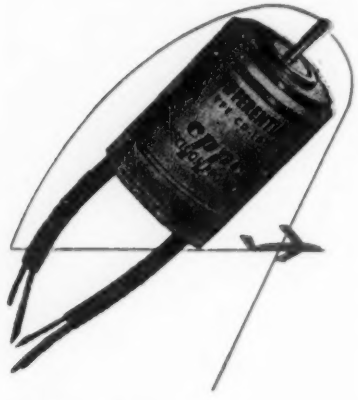
AMP is first, as is its tradition, to bring AUTOMATION to aircraft wiring. For AMP AUTOMATIC WIRE TERMINATORS are in practical, fast, economical use, day in, day out, in most of the leading aircraft companies in the U. S. and Canada. These AMP machines, more than any other single factor, have made pre-wiring methods possible for aircraft. With application speeds ranging in thousands per hour per machine for complete, insulated, terminations, AMP AUTOMATIC WIRE TERMINATORS are leading the attack against wiring bottlenecks.

If you are interested in pre-wiring systems, the latest solderless terminal developments for aircraft, or are curious about automatic termination methods, AMP will send trained survey engineers and demonstration teams to your plant.

AIRCRAFT-MARINE PRODUCTS, INC.
2100 Paxton Street, Harrisburg, Pa.

IN CANADA—AIRCRAFT-MARINE PRODUCTS OF CANADA, LTD.
1764 Avenue Road, Toronto, Ontario, Canada

NEW HIGH ACCURACY
Low Weight
SYNCHRO SERIES . . .



Now available for the first time is the accuracy of the Size #15 1.437" diameter synchro in a Size #10 unit, at a saving of almost ⅔ the weight.

Product of the same engineering team which designed and put into production the original high precision synchro, this complete synchro series is immediately available on a production basis at comparable cost.

SYNCHRO PROGRESS

Year	Error Spread	Weight	Cost
1917	6°	5 lbs.	? Marks
1934	6°	10 oz.	$65.00
1941	2½°	5 oz.	$20.00
1944	20'	5 oz.	$35.00
1954	10'	1¾ oz.	$25.00
Coming	5'	5 oz.	?
Coming	15'	1¼ oz.	?

For full engineering information, drawings, electrical characteristics, etc., of these, also of our size #11 and size #15 — synchro series — and miniature A.C., servo and D.C., motors, write or telephone A. E. Hayes Sales Dept. Telephone MAdison 6-2101.

cppc
CLIFTON PRECISION PRODUCTS CO., INC.
CLIFTON HEIGHTS PENNSYLVANIA

NEW AVIATION PRODUCTS

FILTER ELEMENT is porous stainless.

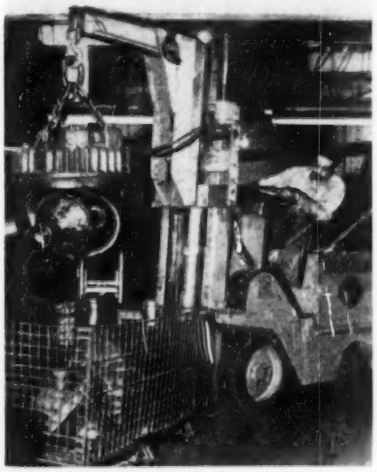
Stainless Filter Element Permits 600F Operation

Porous stainless steel elements in filters for airborne hydraulic service can be used in operations at over 600F.

Made of Type 316 stainless, these elements are available to remove particles in 2, 3, 7, 12 or 22-micron size. They are said to produce low pressure drop and have long service life. They are easily cleaned in the field for re-use.

Filters are presently available for handling 0.5, 3, 6 and 12 gpm., and are said to be considerably smaller than equivalent AN-6235 units.

Aircraft Porous Media, Inc., Glen Cove, N. Y.



MAGNET used with fork-lift truck.

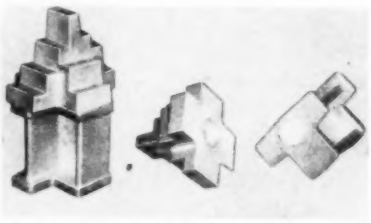
Small Electromagnets Speed Material Handling

A line of small electromagnets for use with mobile materials handling systems has been announced by the Electric Controller & Manufacturing Co. The magnets can be operated with boom-equipped gas or electrical industrial trucks and in some applications can be attached to lift-truck forks.

The magnets are furnished in sizes ranging from 12½ to 36 in. in diameter, weighing from 155 to 1,900 lb. The 690-lb., 24-in.-diameter magnet will lift a 6,000-lb. billet of slab; the 1,390-lb., 29-in. magnet will lift a 13,000-lb. 29-in. magnet will lift a 13,000-lb. billet or slab.

All of the magnets in the series feature bottom plates welded in place. Continuous welds between the inner and outer circumference of the bottom plate and the magnet core are said to provide a water-tight seal. Single-conductor, rubber-armored cables are brought out of the terminal boxes through compression glands and are secured to the magnet case by a strain clamp.

Electric Controller & Manufacturing Co., 2785 E. 79th St., Cleveland 4.



MULTI-STEP blocks and 3-in. riser.

Aluminum Setup Blocks Prevent Table Nicking

Multi-step setup blocks of aluminum alloy that will withstand great weight under clamping pressure have been developed by Jergens Tool Specialty Co.

The manufacturer reports these blocks save machine setup time and, because of their relative softness, protect expensive machine tables from scratches and nicks. The blocks hold work from 0 to 3 in. They can be mounted on 3-in.-high risers and pyramided from 0 to any desired height. The units are packaged in sets of four—two multi-step blocks and two risers.

Jergens Tool Specialty Co., 712 E. 163rd St., Cleveland 10.

Precision Instrument Dials Now Precision-Made

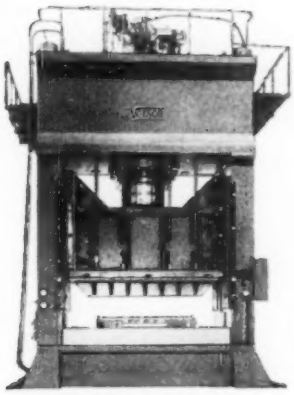
A new method of manufacturing dials for precision instruments is said to reduce possibility of error, according to its developer, Precision Photomechanical Corp.

In the manufacture of divided circles or dials, there are three prime sources of error, PPC states:

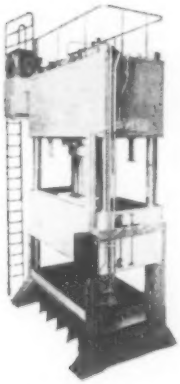
- Non-uniformity of spacing.
- Non-uniformity of line width.
- Eccentricity between center of generation and center of rotation.

The new process, utilizing an optical-mechanical recording instrument, is said

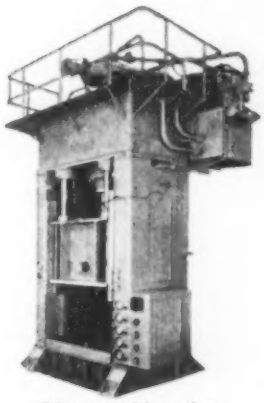
FROM TRADE Verson MARK
A COMPLETE RANGE OF HYDRAULIC PRESSES



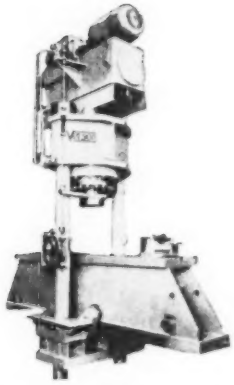
1200 ton straight side



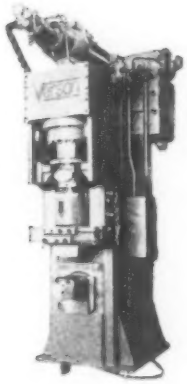
750 ton post type



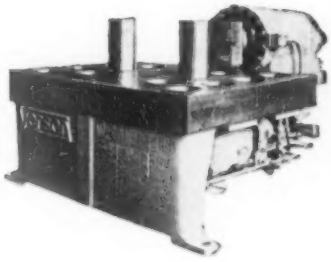
400 ton double action



400 ton straightening press



300 ton horn press



200 ton bending press

Write for your copy of the new Verson Hydraulic Press Catalog which contains detailed data on the entire Verson hydraulic line.

In the Verson line of hydraulic presses, there is a size and type to meet virtually every need from 75 tons up. In addition to the more common types illustrated above, Verson also manufactures such special models as gap type presses, bulldozers, hobbing presses, rubber pad cutting presses and pipe forming presses. If there is a question as to whether a mechanical type or a hydraulic type is best for your job, Verson, as a leading manufacturer of both types, is able to make unbiased recommendations.

Whatever your press problem, bring it to Verson and take advantage of our extensive know-how and experience.

A Verson Press for every job from 60 tons up.

TRADE Verson MARK

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

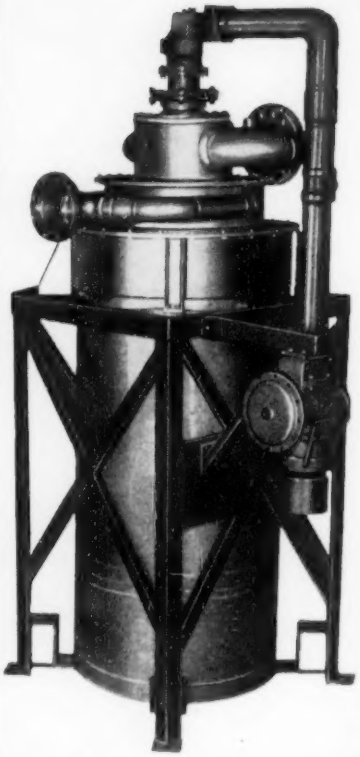
9311 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • SO. LAMAR AT LEDBETTER DRIVE, DALLAS, TEXAS

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

COMPACT SOURCE OF
HIGH PRESSURE HOT AIR OR GAS

THERMAL'S TYPE DF HEAT EXCHANGER

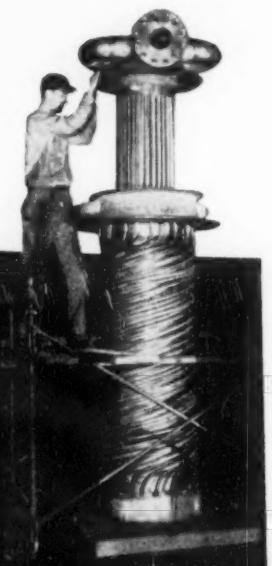
PRESSURES TO 300 PSIG
TEMPERATURES TO 1200 F



Higher temperature units available

Ideally suited for pneumatic accessory testing . . .

Rapid heat-up and response characteristics make the THERMAL DF Heat Exchanger particularly valuable for the wide range of needs of air driven accessories for jet powered aircraft. Convection, not radiation, is the predominant means of heat transfer. Wide temperature changes can be met in minutes, not hours.



STRESS FREE DESIGN

Two pass counterflow construction is used with one pass being coiled to eliminate need for expansion joints. A THERMAL high velocity burner for gas, oil or combination is an integral part of the unit. Construction is all welded and of highest grade stainless steels.

WRITE FOR BULLETIN #105

OTHER THERMAL PRODUCTS & SERVICES . . . . . GAS & OIL BURNERS
• COMBINATION GAS-OIL BURNERS • HEAT EXCHANGERS • AIR HEATERS
• SUBMERGED COMBUSTION • COMBUSTION & HEAT TRANSFER ENGINEERING

THERMAL
Thermal Research & Engineering Corp.
CONSHOHOCKEN • PENNSYLVANIA
REPRESENTATIVES IN PRINCIPAL CITIES

to eliminate error from the first two sources and greatly reduce error from the third. With the process, dial graduations can be made of any width from as fine as three microns (.000120 in.) up to any size desired to meet commercial requirements.

The master dial is generated on a glass plate that is ground optically flat before it is made light sensitive. Its dimensional stability becomes that of glass. Photographically reproduced replicas are made by contact printing under vacuum and dial blanks printed from the master using a center hole of the same tolerance as the hole in the generated master. Using the center hole as a reference in machining operations insures absolute concentricity of the graduations with inner and outer diameters.

Precision Photomechanical Corp., 170 South Van Brunt St., Englewood, N. J.

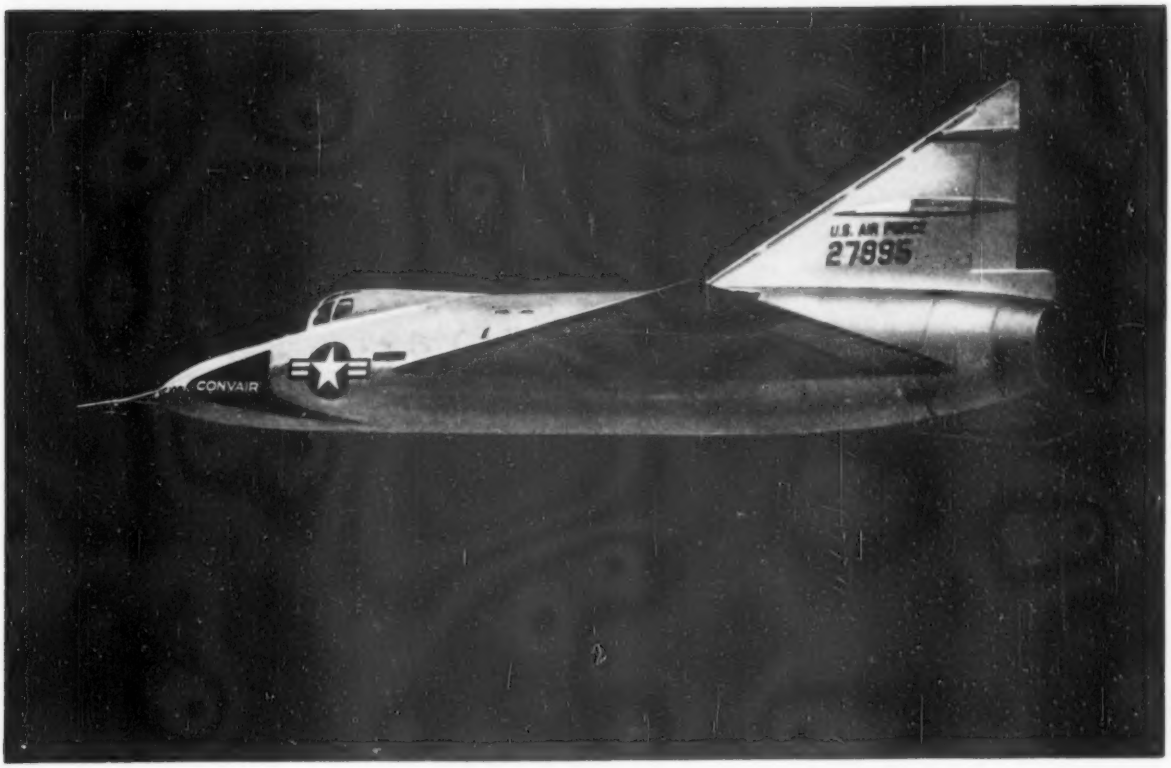
ALSO ON THE MARKET

Airplane landing lamp with new filament base is said to provide longer, more uniform service life, more stable beam pattern, lower maintenance costs, greater assurance of safety than its predecessor. Named GE 4559, lamp is rated at 600 w.; price is $10.75 plus tax.—General Electric, Lamp Division, Nela Park, Cleveland 12.

One-piece self-locking locknut made of high-tensile aluminum meets or exceeds minimum tensile requirements for steel nuts but is 65% lighter. Made of 24ST aluminum, the nut may be used on steel bolts and studs where temperatures do not exceed 250F. The new 105 FS Flexloc nut comes in five sizes: 8-32, 10-32, ¼-28, and ⅜-24.—Standard Pressed Steel Co., Jenkintown, Pa.

Self-releasing collets with clover-leaf grind for use on lathes, collet fixtures, etc., are said to have 'slive' tension which makes release of collet and work easy. Wiping action between collet and closing sleeve eliminates accumulation of chips or dirt between the two.—Royal Products, Mineola, L. I., N. Y.

Moly-Spray-Kote lubricant is sprayed on metal surfaces from pressurized aerosol container. It is non-inflammable and may be applied to hot surfaces. It is non-corrosive and non-toxic, does not contain resin binder. It dries quickly, leaving tenacious, long-lasting film. Maker recommends it for hot-forming operations, for wear-in, gears, toggle joints, power screws and reciprocating parts in general—Alpha Corp., 179 Hamilton Ave., Greenwich, Conn.



TITANIUM and the F-102

From nose to tail, REM-CRU titanium plays an important part in the production of the Convair F-102 . . . just as it does in all advanced-type aircraft.

For REM-CRU titanium's high strength-to-weight ratio, corrosion resistance and complete freedom from stress-corrosion cracking make it an essential material for high performance. In the F-102, commercially pure titanium is used for fuselage skin sections, shrouds, heating and ventilating ducts, and wing leading edge ribs. REM-CRU titanium alloy grades C-110M and C-130M are used extensively for primary structural fuselage frames and wing spar fittings.

REM-CRU, leading producer of titanium, has expanded its facilities to provide *fast* delivery of sheet, strip, plate, bars, wire, tubing and forgings . . . in a wide variety of sizes, shapes and grades – including new high-strength and weldable alloys.

Let our experienced engineering staff – backed by extensive test data – help you make the most of titanium in your application.

To keep abreast of the latest developments on this vital metal, write for the Rem-Cru Review—a free periodical devoted to the application and fabrication of titanium alloys.

REM-CRU TITANIUM REM-CRU TITANIUM, INC., MIDLAND, PENNSYLVANIA

INDIANA GEAR

Aircraft specialists in...

GEAR SHAPING
GEAR GRINDING
GEAR CUTTING
GEAR HOBBING
DRILL PRESS (RADIAL & POWER FED)
HORIZONTAL BORING
BROACHING
INTERNAL GRINDING
EXTERNAL GRINDING
LATHE WORK (TURRET & ENGINE)
HEAT TREATING
METALLURGY
ROTOBLAST
GUN DRILLING
MILLING
TAPPING
NITAL ETCH
AF APPROVED INSPECTION
ZYGLO
MAGNAFLUX
X-RAY EXAMINING
PARKO LUBRIZE
DICHROMATE
DULITE
COPPERPLATE
CADMIUM PLATE
VAPORBLAST
SPRAY PAINTING & BAKING
ASSEMBLY
DESIGN ENGINEERING

Our complete facilities brochure available on request

INDIANA GEAR

INDIANA GEAR WORKS, INC., INDIANAPOLIS 7, IND.

Scare Movie

The air transport industry has a public relations problem on its hands with **The High and the Mighty,** Warner Brothers' screen adaptation of Ernest Gann's best-selling story of a terrifying airline flight from Honolulu to San Francisco.

Movie critics have seen the film, judged it, and set the tone for public reaction. The majority rate it among the top pictures of the year for dramatic presentation, but almost to a man they cite its possible adverse effects upon the mind of the air traveler and the potential air traveler.

Typical is Otis L. Guernsey, Jr., of the New York Herald Tribune. He opens his review with this ominous appraisal: **"You may decide never to step into an airplane again after seeing 'The High and the Mighty.'"**

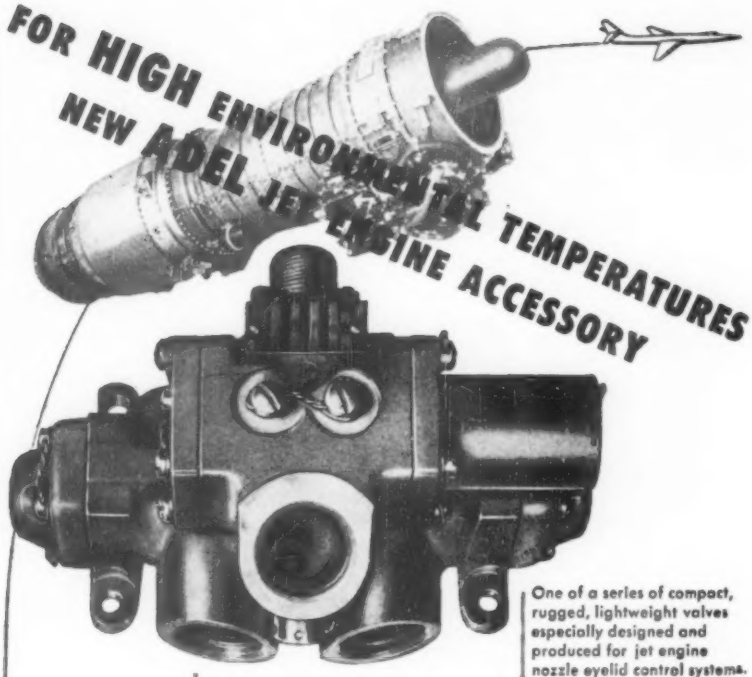
Several airline officials frankly admit that the picture could have adverse effects. "The book was damaging enough," says one, "but a motion picture with a top rating will be seen by a large segment of the population. It could really hurt!"

To those in the industry, the story is loaded with too many improbabilities to be taken seriously. But there is a good chance that the uneducated layman will react to Warners' attempt at stark realism and take it very seriously.

This series of highly improbable events could well lead such a person to the conclusion never to fly again:

- Co-pilot Dan Roman (John Wayne), just prior to takeoff from Honolulu, vividly recalls his flaming crash of a few years ago. His confidence is shaken. Recollection comes from a small boy shooting a cap pistol at him.
- Pilot Sullivan (Robert Stack), with two million hours of safe flying behind

FOR HIGH ENVIRONMENTAL TEMPERATURES
NEW ADEL JET ENGINE ACCESSORY



One of a series of compact, rugged, lightweight valves especially designed and produced for jet engine nozzle eyelid control systems.

OPERATION

A Spring Offset, Two Position, Solenoid Operated, Four Way Valve using engine oil to operate hydraulic cylinders.

B Solenoid energized, 3000 psi at inlet port produces outflow at cylinder 1—cylinder 2 open to return.

C Solenoid de-energized, produces outflow at cylinder port 2, cylinder 1 open to return.

CHARACTERISTICS

1 Ambient temperature range −65° to +350°F.
2 Operating pressure 3000 psi.
3 Ports per AND10050 are available in 1/4", 5/16", 3/8", and 1/2" tube sizes.
4 No packing on sliding members.
5 Operating voltage 18-30 VDC.
6 Current required 1.0 amp. at 30 volts.
7 Continuous duty solenoid.
8 Pilot valve spring loaded against pressure to 4000 psi min.
9 Operating fluid MIL-L-7808.
10 None interflow type valve.
11 Weight 1.75 lbs.

ADEL produces a complete line of Aircraft HYDRAULIC & PNEUMATIC CONTROL EQUIPMENT, HEATER, ANTI-ICING & FUEL SYSTEM EQUIPMENT, ENGINE ACCESSORIES AND LINE SUPPORTS.

For better, safer jet engine performance—Specify ADEL

ADEL LEADER IN ENGINE ACCESSORIES

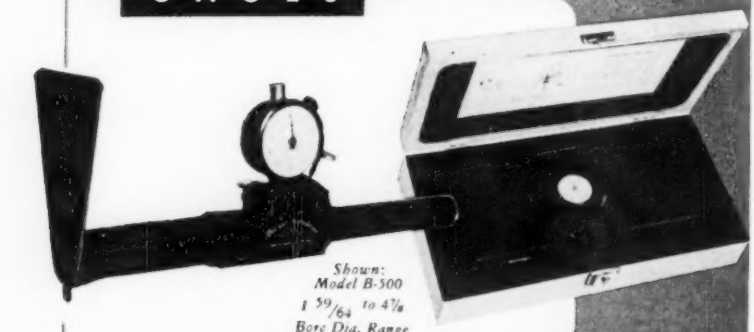
DIVISION OF GENERAL METALS CORPORATION • BURBANK, CALIF. • HUNTINGTON, W. VA.

CANADIAN REPRESENTATIVE: RAILWAY & POWER ENGINEERING CORPORATION LIMITED

. . . FOR DIMENSIONAL CONTROL OF INTERNAL "O" RING GROOVES

Reliant GROOVE GAGES

- Checks out-of-round, spherical radii—eccentric.
- Use as dial bore gage, blind holes—taper.
- Low in cost.



Shown: Model B-500 1 59/64 to 4⅞ Bore Dia. Range

- Standard models to check ⅞" to 4⅝" bore diameters accurately and quickly.
- Models for checking snap ring grooves available.
- Sold through distributors.

Write for complete Catalog 53A

Reliant Industries
4947 Firestone Boulevard
SOUTH GATE, CALIFORNIA

MANUFACTURERS OF PRECISION GAGES

MOLY SPRAY KOTE® lubricant

it's NEW

in handy sprayer

a dispersion of micro-fine solid lubricants, principally molybdenum-disulfide, in "Fluron".

Deposits a uniform, dry lubricating film on metal surfaces . . . outstanding for its chemical and thermal stability and its low coefficient of friction at extreme bearing pressure.

PREVENTS GALLING & SEIZING.

Send today for details.

THE ALPHA CORPORATION
179 Hamilton Ave. • Greenwich, Conn.

a must in Guided Missiles and Aircraft

perfect valve performance

CIRCLE SEAL

100% RELIABILITY with CIRCLE SEAL VALVES

Floating "O" Ring construction gives perfect seal in:

- CHECK VALVES
- SHUTTLE VALVES
- RELIEF VALVES
- MANUAL RELEASE VALVES

Write for catalog information

CIRCLE SEAL precision valves

JAMES•POND•CLARK

2181 East Foothill Blvd., Pasadena 8, Calif.

him, is obsessed with the idea that the flight is ill-fated before it ever leaves the ground. As the flight progresses, his obsession becomes more intense. When the crisis comes he goes to pieces.

• The four-engine plane loses a propeller. Propeller ruptures a wing tank, causing heavy loss of fuel. Engine is left hanging from nacelle.

• Can they still make San Francisco on the amount of fuel remaining with three engines, or will they be forced to ditch? The supposedly experienced navigator gets panicky, goes way off on his calculations by figuring statute miles instead of nautical miles. Ditching seems inevitable.

• Passengers are given instructions and prepared for ditching.

• Stewardess is shown sobbing at rear of cabin.

• Navigator regains his composure, takes another fix and concludes that they could make the coast if they can pick up 11 extra minutes of fuel.

• Mutiny takes place in the cockpit, with co-pilot temporarily taking command. Pilot has given up, feels that all is lost and wants to ditch immediately. Co-pilot slaps him around, takes over, begins cutting down on power to save fuel. Hysteria reigns in the cockpit for several minutes.

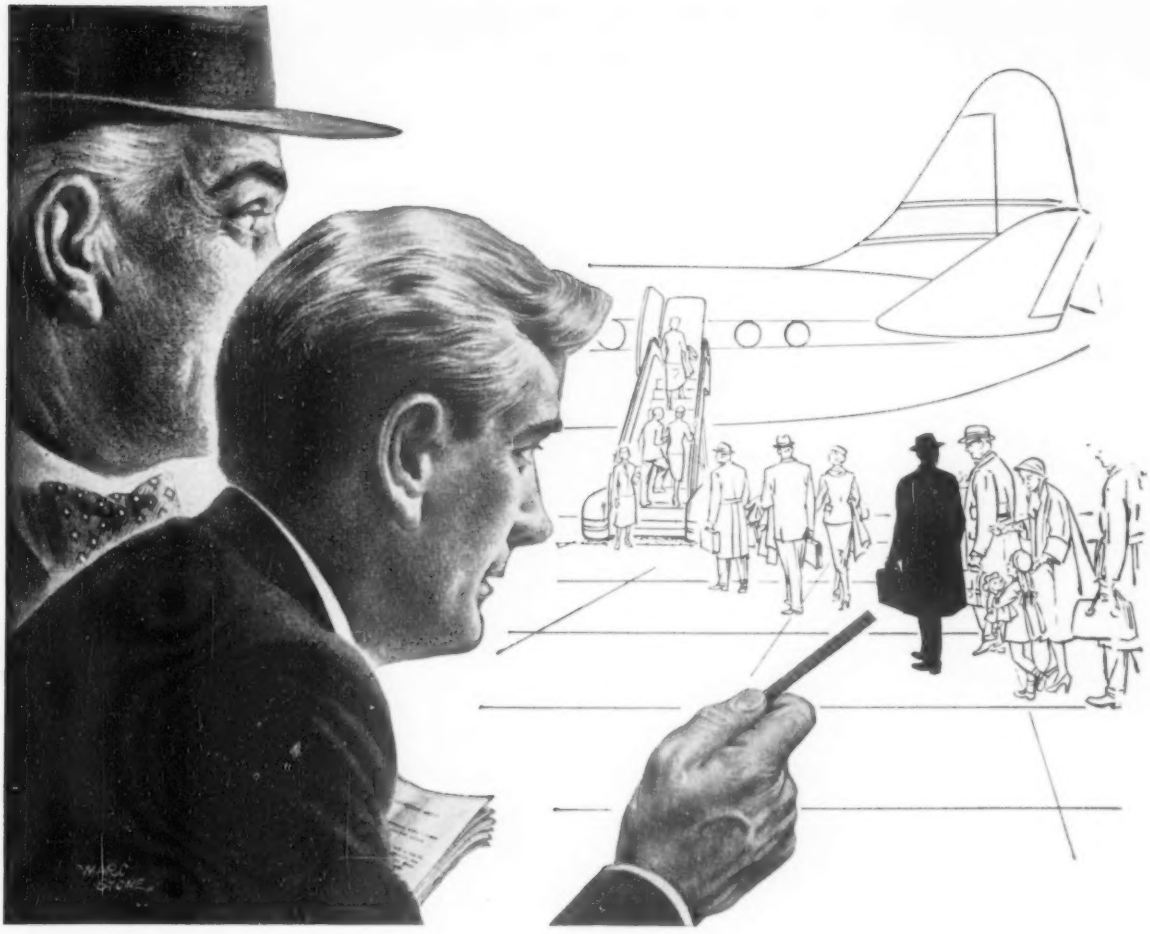
• Pilot, after some time, "comes to his senses." He then agrees that they have a slim chance of making it and resumes command.

• Aircraft makes dramatic approach into San Francisco, flying dangerously low, making perfect landing with 30 gal. of fuel to spare. —FS

Telling the Market

American Chemical Paint Co.'s check list of **metal protective and paint bonding chemicals and processes** has been put up in a new revised format. Write company at Ambler, Pa. . . . A new 28-page catalog (No. 1748) on its reinforced **sinoid line of grinding wheels** has been published by Horton Co., Worcester 6, Mass. . . . A complete loose-leaf set of **Civil Air Regulations** and the **Civil Aeronautics Manual** is sold on a subscription basis by Rules Service Co., 726 Jackson Pl., N.W., Washington, with information brought up to date two weeks after changes are made.

Creep and Stress-Rupture Testing Apparatus, a four-page bulletin on machines used in testing special-alloy steels used in high-temperature service is published by Labquip Corp., 3521 Cicero Ave., Chicago 41. . . . **"Flame-Plating,"** a 16-page booklet, covers a method of applying thin coatings of tungsten carbide on metal parts. Write Linde Air Products Co., 30 E. 42nd St., New York 17.



THERE GOES THAT PASSENGER . . .

Since he came back from Europe he's been a man to watch. Over there leading airlines are operating the Viscount and setting up new records for passenger preference—and profits! That passenger found flying by Viscount was something really new! *Certainly* it was the most comfortable flight he had ever made. *Certainly* it was the quietest. *Certainly* one noticed hardly any vibration—and those four turboprop engines inspired a feeling of real confidence.

Watch that passenger . . . Back in the United States he still flies—and talks—and looks forward to the day when he can fly by Viscount again. This may be sooner than he once thought. For among the airlines that have already ordered Viscounts are Capital Airlines, Trans-Canada Air Lines and British West Indian Airways.

FORECAST INTO FACT

Its designers predicted great things for the turbo-prop Viscount. Here is what it has achieved—so far:

- ***Earned more than $1,000,000 profit for British European Airways in six months.***
- ***Doubled BEA's share of traffic on important routes.***
- ***Cut inter-city flight schedules.***
- ***Won firm orders from ten airlines in both hemispheres—including TCA and B.W.I.A.***

VICKERS VISCOUNT

FOUR ROLLS-ROYCE PROPELLER-TURBINE ENGINES

VICKERS-ARMSTRONGS LIMITED · AIRCRAFT DIVISION · WEYBRIDGE · ENGLAND

REPRESENTED IN THE UNITED STATES BY CHRISTOPHER CLARKSON, 342 MADISON AVENUE, NEW YORK 17, U.S.A.

IT TAKES TWO

DISPLAY ADVERTISING

- AROUSES INTEREST
- CREATES PREFERENCE

DIRECT MAIL

- GETS PERSONAL ATTENTION
- TRIGGERS ACTION

After your prospect has been convinced by DISPLAY ADVERTISING, he still must take one giant step. *He must act.* A personalized mailing piece direct to his desk, in conjunction with a display campaign, is a powerful action getter.

McGraw-Hill has a Direct Mail Division ready to serve you with over 150 specialized lists in the Industrial field.

To get your copy of our free INDUSTRIAL DIRECT MAIL CATALOGUE (1954) containing complete, detailed information about our services, fill in the coupon below and mail it to McGraw-Hill.

Do it now! The best advertising programs are planned well in advance.

Direct Mail Division,
McGraw-Hill Publishing Co., Inc.
330 West 42nd St., N. Y. 36, N. Y.

Please forward my free copy of the McGraw-Hill "Industrial Direct Mail Catalogue."

Name_____

Company_____

Address_____

City_____ State_____

SPECIAL SERVICES TO THE AVIATION INDUSTRY

AIRCRAFT DEALERS

EXECUTIVE TRANSPORT AIRCRAFT
All Models
BEECHCRAFT LOCKHEED
CONVAIR GRUMMAN
DOUGLAS CESSNA
AERO COMMANDER
JIM WELSCH Aircraft Sales
60 East 42nd Street, Suite 628
New York 17, New York Murray Hill 7-5884

EXECUTIVE AIRCRAFT
Complete Services and Sales
DC-3 LODESTAR D18S

Inc. of ST. LOUIS **REMMERT-WERNER** Inc. of TOLEDO

PARTS & SUPPLIES

NAVCO INC.
Lambert Field
St. Louis, Mo.
TErryhill 5-1511
Has all Parts and Supplies for Executive
DC-3 LODESTAR BEECH
Airframe Engines Radios
A.R.C. Bendix Collins Lear Sperry Wilcox
P&W Continental Wright Goodrich Goodyear

C.A.B. Ltd.
49, Old Bond Street, London, W.1. England
Airframe spares for the following aircraft: Convair C240 and 340; Constellation 049, 749, 1049; Douglas DC-6 A & B, DC-4, C-47; Boeing 377. Engine spare parts for P & W 2000, 2800, 1830; Wright Cyclone BD.1, BA 3. C.A.B. Ltd., 49, Old Bond Street, London, W.1. Phone, Mayfair 0035. Cables, "Centaero, London".

PROPELLER SERVICE

RAS INCORPORATED
PROPELLER OVERHAUL
Pick up and delivery in New York area. Finest equipment. Experienced personnel. Approved repair station for Hamilton Standard and Hartzell propellers.
READING AVIATION SERVICE, INC.
MUNICIPAL AIRPORT READING, PA.

SEARCHLIGHT SECTION
(Classified Advertising)
EMPLOYMENT • BUSINESS
EQUIPMENT — USED OR RESALE
OPPORTUNITIES

UNDISPLAYED RATE
$1.80 a line, minimum 3 lines.
Positions Wanted rates are ½ the above payable in advance.

DISPLAYED RATES
The advertising rate is $18.00 per inch

ENGINEERS

AIR FRAME DESIGNERS
STRESS ANALYSTS

. . . . . with a minimum of five years experience required by rapidly expanding organization engaged in aircraft design program.

UNITED CONSULTANTS COMPANY
Norwood Airport Norwood, Mass.

RESEARCH ENGINEERS

Senior level research engineering positions are now available in our Research Laboratory. The work involves development and evaluation testing of electro-mechanical aircraft components. Three to eight years' experience in aircraft design or laboratory test work desired in addition to Mechanical or Electrical Engineering Degree.

WRITE SECTION
ENGINEERING PERSONNEL OFFICE
NORTH AMERICAN AVIATION INC.
International Airport Los Angeles 45, Calif.

ENGINEER

MECHANICAL OR AERONAUTICAL

An outstanding engineering concern has excellent opportunities for a Senior Stress Analyst for work on Gas Turbine Compressors and Afterburners. Must be able to develop methods of calculations. Advance degree in engineering or applied mathematics preferred. All replies treated confidentially. Write giving education, experience, salary history and personal data to Engineering Personnel Dept.

ALLSTATES ENGINEERING CO.
25 NO. WARREN ST. TRENTON, N. J.

MANUFACTURER'S SALES REPRESENTATIVES

WANTED FOR

Michigan, Illinois, Indiana, Ohio, New York, New Jersey, Pennsylvania, Maryland and Virginia by well known and established California companies doing low and medium pressure plastic laminating and metal bonding; making sandwich structures; producing aluminum and glass fabric core materials; manufacturing resin impregnated and coated fabrics, high strength adhesives and low pressure resins and conducting diversified plastics and adhesive research and development.

We are interested only in men of proven ability who are now calling on industrial accounts. Commission basis.

Reply giving territory you now cover, present lines and how long represented, references, names of personnel employed and brief background.

RW-3390, Aviation Week
1111 Wilshire Blvd., Los Angeles 17, Calif.

For Engineers . . .

Clear Horizons ahead

. . . at Goodyear Aircraft Corporation

BUILD YOUR CAREER and help build tomorrow's world with the pioneer and leader in lighter-than-air craft. There's a clear, bright future at Goodyear Aircraft for engineers with talent, aptitude and ambition.

FORCEFUL, CREATIVE THINKING is the key to Goodyear's progressive research and development programs in missiles, electrical and electronic systems, servomechanisms, new special devices and fiber resin laminates. Design and development engineering opportunities are many and varied . . . are now available to capable and imaginative men and women in the field of airships, aircraft and aircraft components.

POSITIONS ARE OPEN in several fields with salaries based on education, ability and experience.

Physicists	Civil engineers
Mechanical engineers	Welding engineers
Aeronautical engineers	Electrical engineers

Openings also exist for personnel with ability and experience in technical editing and writing, art, and motion pictures.

AKRON, HOME OF GOODYEAR AIRCRAFT, is located in the lake region of northeastern Ohio. Cosmopolitan living, year-round sports and recreation, cultural and educational advantages make this thriving city an ideal spot for a pleasant home.

THE TIME TO PLAN A CAREER IS - NOW! Write, giving your qualifications, or requesting an application form.

C. G. Jones, Salary Personnel Department

GOODYEAR AIRCRAFT CORPORATION

AKRON 15, OHIO

GOODYEAR AIRCRAFT

hydraulics engineers

Honeywell's expanding Aeronautical Division has unusual openings for qualified men in the field of precision hydraulic equipment. If you are interested in a permanent position in the aeronautical control field with America's largest control manufacturer, consider these challenging opportunities now available at top salaries.

Mechanical Design Engineer —Hydraulics

New position open in the design of precision hydraulic servos, valves, actuators and other hydraulic products as applied to jet engine control systems. Required ME degree or equivalent. Experience in design with emphasis on reduced cost of production especially pertinent.

Production Engineer— Hydraulics

New production engineering position open working on problems of manufacture, assembly and test of high pressure hydraulic products including fuel injectors, servos, valves, actuators. Requires ME degree or equivalent and minimum of 5 years' experience in manufacture of hydraulic products. Ability to interpret production requirements for design engineers especially valuable.

Hydraulics Design Engineer

New opportunity in design of hydraulic components and systems involving servos, valves, actuators for automatic flight controls. Requires engineering degree or equivalent and 5 years' design experience. Ability to lead others in creative projects desired.

Hydraulics Research Engineer

Unusual newly created position in research involving studies in control valve configurations, acoustical phenomena in hydraulic systems, silting and fluid contamination and related subjects. Also will act as consultant to engineering department. Requires ME degree or equivalent with background of advanced training in hydraulic control areas.

If you are interested in any of these well paid positions located in Honeywell's new Aeronautical plant in Minneapolis, send your resumes to:

MINNEAPOLIS **Honeywell**

First in Controls

J. Arthur Johnson
Director of Engineering Placement
Dept. AW-7
Minneapolis-Honeywell Regulator Co.
Minneapolis 8, Minnesota

An Opportunity

is offered for intelligent, imaginative engineers and scientists to join the staff of a progressive and self-sustaining, university-affiliated research and development laboratory. We are desirous of expanding our permanent staff in such fields as design studies of advanced supersonic aircraft, analytical and experimental studies of aeroelasticity, helicopters, aircraft structures, control and stability, large scale wind tunnel testing, and in various other applied research fields of aeronautics.

Salary structure and benefit programs are on a par with industry. In addition, there are many tangible advantages, such as our self-sponsored internal research policy, of interest to men with ingenuity and initiative.

CORNELL AERONAUTICAL LABORATORY, INC.
BUFFALO 21, NEW YORK

SALES ENGINEERING MANAGER

WANTED: Thoroughly experienced Sales-Engineer for Manager of Aircraft Division

RESPONSIBILITIES: Supervision of field representatives, coordination of product design requirements, field service engineering, customer and governmental liaison

REMUNERATION: Commensurate with ability & experience

RESISTOFLEX CORPORATION
Belleville, New Jersey — Personnel Department

HYDRAULIC ENGINEERS for TECHNICAL SALES

Major designer and manufacturer of aircraft-type hydraulic controls and transmissions has several excellent opportunities for experienced engineers who combine both sales and technical ability. Potential locations in Dallas, Los Angeles, New York and Washington, D. C. Please send photograph if available and full particulars concerning education, experience and personal qualifications to

P-3249, Aviation Week
520 N. Michigan Ave., Chicago 11, Ill.

OPENINGS IN HELICOPTER EXPRESS AND PASSENGER PROGRAM

Traffic, Materiel Control
Supply, Cargo, Accounting, Audit
Ground Operations

LOS ANGELES AIRWAYS, INC.
Box 10155 Airport Station Los Angeles 45, Calif.

SKILLED
PILOTS
AVAILABLE
No Fee to Employers
PILOTS EMPLOYMENT AGENCY
Teterboro (N. J.) Airport
Hasbrouck Heights - 8-1001

OPPORTUNITY
FOR
HYDRAULICS ENGINEER
IN
TULSA, OKLAHOMA

Qualified to Design and Analyze Aircraft High Pressure Hydraulics Systems and Components

Administrative Abilities Desired

Salary Open and Dependent Upon Experience and Ability

For information concerning the above and many other attractive openings created by our expansion program

Direct Inquiry to

J. L. JOHNSON
Engineering Personnel Manager

DOUGLAS

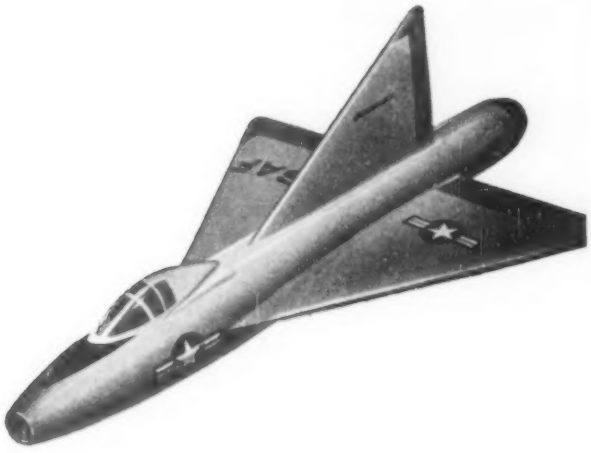
DOUGLAS AIRCRAFT COMPANY, Inc.
Tulsa Division
TULSA, OKLAHOMA

REGIONAL SALES POSITION
and
REGIONAL SERVICE POSITION
Open With
WORLD'S LEADING BUSINESS AIRPLANE MANUFACTURERS

Wholesale sales experience administering sales program with distributor-dealer organization as well as retail sales experience required in automotive or similar field. Service experience also required for regional service position. Must be competent pilot. Excellent opportunities for qualified men.

Send Resume of Experience and Recent Photo to Employment Manager

CESSNA AIRCRAFT COMPANY
Wichita, Kansas



THE CONVAIR CHALLENGE TO ENGINEERS OF EXCEPTIONAL ABILITY

Beyond the obvious fact that Convair in San Diego offers you a way of living judged by most as the nation's finest from the standpoint of weather, beauty and interesting surroundings, the Convair Engineering Department offers you challenges found in few places.

It is, we believe, an "engineers" engineering department—interesting, energetic, explorative — with the diversity that means security for capable personnel.

As proof, consider this: Convair developed and flew the world's first turbo-prop airplane, first delta-wing airplane, first delta-wing seaplane — engineered and built the world's biggest transport, the world's safest high-performance commercial aircraft.

Or this: Convair's B-36 is the world's largest operational bomber, Convair's B-24 Liberator was World War II's most used heavy bomber, Convair's XP5Y-1 holds the world's endurance record for turbo-prop aircraft.

Or this: Convair has been awarded the nation's first production missile contract and the first production contract for supersonic interceptors.

Currently . . . Convair has the greatest diversity of aircraft engineering projects in the country, including high-performance fighters, heavy bombers, large flying boats, transports, trainers, seaplane fighters and guided missiles.

Currently . . . Convair has a completely integrated electronic development section engaged in advanced development and design on missile guidance, avionic projects and radar systems.

Would you like to join us? We earnestly need engineers of proven ability — men who want to make full use of their time, their minds, their skills and abilities solving the complex problems confronting us in these projects. If you are such a man, write us and we'll send you a free booklet about us, plus other interesting material to help you make the decision.

Write: H. T. BROOKS, Engineering Personnel
Department 200

CONVAIR

3302 PACIFIC HIWAY
in beautiful San Diego, California

CAREER BUILDING THROUGH RESEARCH

The Cook Research Laboratories, one of the Nation's most progressive research and development laboratories, has openings for qualified engineers and physicists at both Senior and Junior levels.

A Growing Company
Outstanding Personnel
High Starting Salaries
Excellent Working Conditions

There are immediate openings in the following fields:

Radar
Pulse Systems
Microwave Techniques
Servomechanisms
Operations Research

Contact

MR. D. M. HALLIDAY

COOK RESEARCH LABORATORIES

8100 Monticello Avenue Skokie, Illinois
KE 9-2060

A Division of
Cook Electric Company
Chicago

Electrical and Mechanical Engineering and Manufacturing Since 1897

ENGINEERS

new aircraft projects

at **RYAN**

IMMEDIATE OPENINGS FOR

Aerodynamicists
Research Engineers
Engineering Designers
Systems Analysts
Electronic Engineers
Dynamics Engineers

Replies to Administrative Engineer will be held in strict confidence

RYAN
AERONAUTICAL COMPANY
SAN DIEGO 12, CALIF.

Train now for your aviation career
CAA approved course available under GI Bill
AIRCRAFT DISPATCHER
and
FLIGHT OPERATIONS
(license in four months)
other courses:
Pilot Ground school and Link Training
Flight Navigator and Airline Stewardess
Aviation Cadet Preparatory and Link Instructor
EASTERN AIR NAVIGATION SERVICE
157 West 54 Street New York City

HILLER HELICOPTER
Model UH 12A with Agricultural Spray equipment, full canopy, dual controls, 2-way radio.
In excellent condition
EAST COAST AVIATION CORPORATION
Bedford Airport Lexington, Mass.

FOR SALE
BEECHCRAFT C-18S
Red and white, custom interior, boots, 0-time spare engine, well maintained, company owned, excellent radio equipment. For complete details, write
FS-3362, Aviation Week
520 N. Michigan Ave., Chicago 11, Ill.

FOR SALE
STRUTS, main gear, 2, (DC4)
5073670-500, used, need overhaul.
MISC. PARTS, DC4 and DC6B, new and used.
For inspection or information, write
FS-3412, Aviation Week
330 W. 42 St., New York 36, N. Y.

WANTED

SPARKPLUGS WANTED
Surplus or used aircraft sparkplugs wanted. Highest prices paid for most all types. Any condition.
RADIO & ELECTRONIC SURPLUS
13933-9 Brush St. Detroit 3, Mich.

Well established distributor of specialized types of equipment and supplies desires additional exclusive lines to sell to Aircraft Manufacturers in Southwest area. If you need aggressive sales organization, send details to
ROBCO, INC.
5348 Jillson St. Los Angeles 22, Calif.

EXPORT YOUR PRODUCTS
Reputable, well-established Export Corporation will represent and sell your aviation products in any Latin-American country.
Write:
P.O. Box 587 Inglewood, California

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

FACTORY MANAGER with airframe manufacturing background, capable of coordinating all phases of manufacturing for a plant employing approximately one thousand people. Excellent opportunity with an amply-financed, progressive company located in the Midwest, who are in production on assemblies for major aircraft manufacturers. In reply include complete experience outline and salary expected. All replies will be handled on a strictly confidential basis. P-3243, Aviation Week.

AERONAUTICAL ENGINEERS B.S. or M.S. in Aero. High Speed Wind Tunnel Testing. Caltech, Personnel Office, Pasadena, Cal.

CONNECTICUT HYDRAULIC Manufacturer desires Field Service Engineer to contact Airframe Manufacturers. P-3371, Aviation Week.

POSITIONS WANTED

EXECUTIVE PILOT A.T.R. on DC-3 C-46 experienced on Bonanza and Cessna 4 yrs. Military 4½ yrs. Executive 2 yrs. Airline current passport 7200 hours, age 37 desire executive or airline. PW-3303, Aviation Week.

AIRLINE TRANSPORT Pilot, 15 yrs. continuous flying, 7400 hrs. 2000—4 eng., 3700—twin eng., 1700—single eng., 750—ins. Instructor—Single—Multi-Engine Land—DC-3, DC-4, B-26, Boeing 377, B-17 Lockheed 18, Grumman G-73. Age 34. Foreign and Domestic experience. Executive pilot position desired. Resume on request. PW-3184, Aviation Week.

MARINE CORPS Pilot being released in Sept. 25 yrs old, single, 2½ yrs college, 1500 hrs military flight time, 150 hrs light plane time. Recent exp. includes single engine, twin engine, four engine, jet single and twin engine, flight test for repair and modification depot, night and instrument instruction (prop and jet). Accident free record. Looking for challenging, interesting flying position in the aviation industry with a future. Can locate anywhere and will furnish references. PW-3321, Aviation Week.

GRADUATE ENGR., ex. A.F. officer, with Airline, Govt., R&D experience desires pos. in Europe. PW-3337, Aviation Week.

SELLING OPPORTUNITY WANTED

WESTERN EUROPE or Spain. Assignment sought as technical advisor or manufacturer's representative by mechanical engineer, age 32, broad experience in aircraft and electronics. Five years foreign business experience. Fluent Spanish, knowledge of French. RA-3268, Aviation Week.

FOR SALE

World's largest stock new and use daircraft parts, engines and supplies. Free Lists. Financing. Vestco, Dept. F. Box 5306 T.A., Denver, Colo.

For Sale: 1949 Cessna with 300 H.P. Jacobs Engine. Engine has approximately 200 hours since factory major, at which time porous chrome cylinders were installed. Total time: Less than 900 hours. Complete instrument panel with Lear VHF; Omni and Low Frequency; ILS; Bendix ADF; Lear L-2 Auto Pilot; Flares and other extras. Airplane is painted ivory with a deep maroon trim. $12,000.00 Cash. No trades. Call or write The Kline Mfg. Co., Galena, Ohio.

Two P & W R2800-75 engines Spec 5E8. Both zero hours TT, zero hours TSO. Also two complete props zero hours TSO, 23E50-505 with 6491A-6 blades. Southern Air Transport, Inc. P. O. Box 114, Miami 48, Florida.

FOR SALE

LODESTAR

This is a fine airplane with extremely low air frame hours. Every item was carefully checked by expert men before new upholstery, floor and toilet recently installed. Has eight (8) chairs with large cargo space and tie downs, low engine hrs., full radio equipment, excellent ventilation and heating. Has constant maintenance by factory representative.

FOR SALE

LOCKHEED 12-A

A fine airplane with seven ft. couch. Three (3) belts and two chairs with work table, toilet, inside and outside baggage or cargo compt., ship to shore telephone and full feathering props and full radio.

In addition to factory representative maintenance, our pilot, L. L. Decker, who has over sixteen (16) years flying experience, has constantly checked and supervised all maintenance for 100% safety.

Both planes have full Omni for U. S. and Canada and are ready for safely flying anywhere.

A. L. DOUGHERTY COMPANY
CONTRACTORS
830 S. Pearl St. Albany, N. Y.
Phone:
R. B. Cleary, Albany 3-2435
or
L. L. Decker, Newburg 6418.

A.C.E.S

R-2800-51-M-1
Gold Seal Engine

A.C.E.S. announces the C.A.A. approved Gold Seal Series Engines. Our 2800-51-M1 engines have been in scheduled airline operation for over nine months and have given thousands of hours of trouble free service. Our customers report faster and more economical cruise operations. More power available for continuous single engine operation. This is due to advanced engineering which makes for better cooling and improved fuel distribution.

C.A.A. APPROVED OVERHAULS
• R-1830-92 • R-985-AN1-3

ALL WORK AND ENGINE SALES CARRY OUR 100 hr. WARRANTY

C.A.A. APPROVED REPAIR STATION No. 3604 with the following ratings: POWER PLANT—Class 2 Unlimited and ACCESSORY—CLASS 1—CLASS 2 Limited.

AIR CARRIER ENGINE SERVICE Inc.
Int. Airport Branch
P.O. Box 236, Miami 48, Florida
Cable "ACENGSER"

ACES — AIR CARRIER ENGINE SERVICE, INC.

WILLIAM C. WOLD ASSOCIATES

SPECIALISTS IN THE SALE OF *Transport Aircraft*

516 FIFTH AVENUE - NEW YORK 36, N. Y.
TELEPHONE MURRAY HILL 7-2050
CABLE BILLWOLD NEW YORK

Compared with the most widely used prewar twin-engine transports, the Martin 202 carries almost twice the payload, cruises at speeds up to 100 miles an hour faster and climbs at a nearly 50% greater rate, but operates from the same airports. The Martin 202 was the first postwar transport to be certified under the terms of Part 04B of the United States Civil Aeronautics Regulations, established to assure the highest standard of safety.

Due to an unusual situation, a fleet of nine aircraft, together with spare parts, are available for sale, lease, lease-purchase or trade, singly or as a fleet. Detailed specifications on request.

MARTIN 202

FOR SALE

PRATT & WHITNEY

NEW AND UNUSED

R-1830 Pistons - Part No. 35780
Lots less than 500.....$14.50 ea.
Lots 500 or more.....$13.50 ea.

R-1340 Pistons - Part No. 15373+10
Lots less than 500.....$9.00 ea.
Lots 500 or more.....$7.50 ea.

P. D. SMITH
10901 SHERMAN WAY
SUN VALLEY, CALIF.

SUPER-92

over **200** mph for your **DC-3**

CAA Approved R1830-SUPER-92 engines allow 700 HP normal cruise, better single engine—lower fuel and maintenance milage costs with 20,000 extra miles between changes, with same overhaul intervals and costs as —92. Fully interchangeable with —92 —same weight, mounts, cowls, lines, etc. Proven by thousands of hours of practical executive operation.

ENGINE WORKS

LAMBERT FIELD INC. ST. LOUIS, MO.
PRATT & WHITNEY CONTINENTAL
WRIGHT LYCOMING
SALE CAA OVERHAUL EXCHANGE

LOCKHEED PV-1

AVAILABLE FOR IMMEDIATE SALE

SHIP HAS APPROXIMATELY 325 HRS SINCE NEW. VERY CLEAN — WILL STAND MOST RIGID INSPECTION. UNCONVERTED. MAY BE INSPECTED AT OUR FORT WAYNE BASE.

CALL or WIRE

LEEWARD AERONAUTICAL
P. O. BOX 210 PHONE H-2145
FORT WAYNE (BAER FIELD) INDIANA

FOR SALE

Douglas—DC-3, DC-4, DC-6
Convair—240
Lockheed—Constellation
Beech—D-18S, C-18S
Lodestars—Executive Interior or For Conversion

Phone—Wire—Write

WESTAIR, INC.
WHITE PLAINS NEW YORK

CAL-Pioneer Merger Approval Expected

- **Purchase proposal wins CAB examiner's nod.**
- **But Continental-Braniff combine is ruled out.**

Merger of Continental and Pioneer Airlines appears certain following a recommendation by Thomas L. Wrenn, Civil Aeronautics Board examiner, that CAB approve the proposal.

If approved by the Board, the merger would be the first instance in which a trunkline purchased an operating local service airline, Wrenn says.

At the same time, Wrenn ruled out a Continental-Braniff Airways merger, investigation of which had been instituted by the Board and consolidated with the CAL-PAL case.

CAB ordered a Braniff-CAL merger investigation in case the record "dictated" disapproval of the voluntary agreement between Continental and Pioneer so that it would be in a position to determine if a BNF-Continental merger would be in the public interest.

▶ **Substantial Savings**—Wrenn approved the CAL-PAL merger because:

- Integration of the two systems will result in substantial saving in aggregate need for mail pay of the two airlines.
- Routes will integrate satisfactorily from an operational standpoint.
- Competitive route structure of the area will not be altered materially.
- It will provide improvement in service to the public.
- It is consistent with Air Coordinating Committee's policy report to the President.
- It is consistent with the policy of the Board to maintain adequate local air service.

▶ **Merger Plan**—Continental and Pioneer agreed last December (AVIATION WEEK Dec. 21, 1953, p. 69) to the following merger plan:

- Continental would pay Pioneer its net book value in cash at the time of the purchase plus 65,000 shares of CAL stock valued at $6 a share. Total purchase price would be paid partly by Continental's assumption of certain of Pioneer's liabilities.
- Routes of the two airlines would be combined and all personnel retained.
- PAL president Robert J. Smith and board chairman William F. Long would join CAL's board of directors, increasing its number from 11 to 13.
- CAL would retain Pioneer officers Harding L. Lawrence, Harold B. Seifert and E. W. Bailey.
- PAL stockholders would retain their shares in the separate Pioneer Aeronautical Services, a corporation formed to dispose of PAL's Martin 2-0-2 equipment returned from scheduled service when CAB refused to increase subsidies to operate the aircraft.

The contract is subject to approval of the Board; stockholders of both airlines; Chase National Bank of New York, creditor of both carriers, and First National Bank of Dallas, creditor of Pioneer.

▶ **Less Subsidy**—In their joint application of merger, both airlines estimate their integration for the 12 months ending June 31, 1955, would result in $821,194 less break-even need and $916,030 less mail pay.

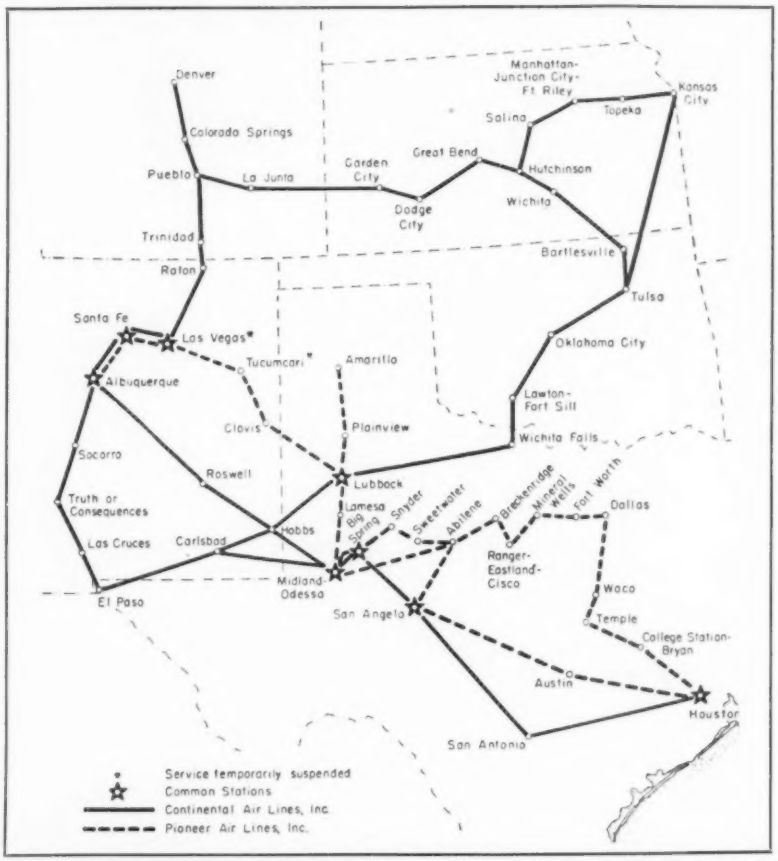
CAB bureau counsel said the merger would reduce their break-even need approximately $897,000 from the 1953 level. He did not estimate the reduction in mail pay that would follow the $897,000 break-even saving "since this would require a detailed consideration of the disallowance that may be made in a future rate proceeding," Wrenn reports.

"However," he adds, "bureau counsel is of the opinion that the estimated $897,000 reduction in break-even need would provide the basis for a substantial reduction in the subsidy mail pay required by the two carriers."

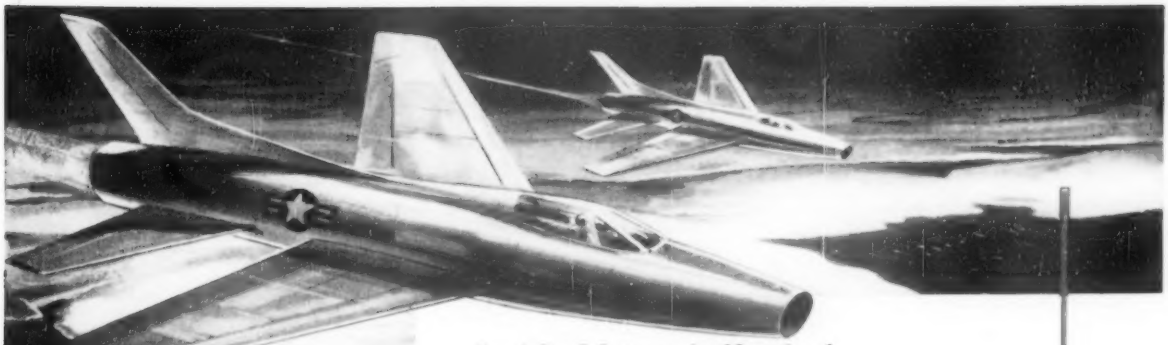
▶ **Route Advantages**—As to integration of services, Wrenn finds:

"The Continental and Pioneer routes are joined at eight common points, four of which (Houston, Tex., Albuquerque, N. M., Lubbock, and Midland-Odessa, Tex.) are major operational centers for both carriers. The Pioneer system fits into the Continental system with three of the common stations presently in operation by both carriers at the center of Pioneer's system.

"The number, geographic location



CONTINENTAL-PIONEER ROUTES now total 5,167 mi., join at eight common points.



Specialized fasteners by Monadnock

★ SPEED ASSEMBLY

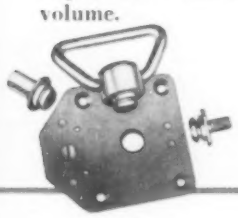
★ GIVE TROUBLE-FREE PERFORMANCE

★ EASE MAINTENANCE

With a wealth of experience in working with leading aircraft manufacturers across the country, Monadnock is fully equipped to design specialized fastening devices to meet your particular requirements and to produce them in volume.

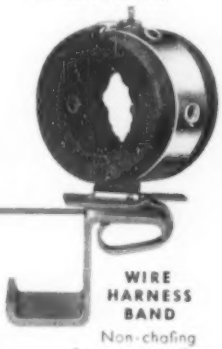
SOL-A-NUT
Heat Resistant
Stainless Steel Nut

From polar cold . . . . . to tropic heat



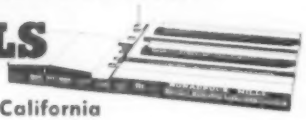
WEDJIT
Seat and Cargo
Tie-down Fastener

AIRLOC
Cowling and
Panel Fastener



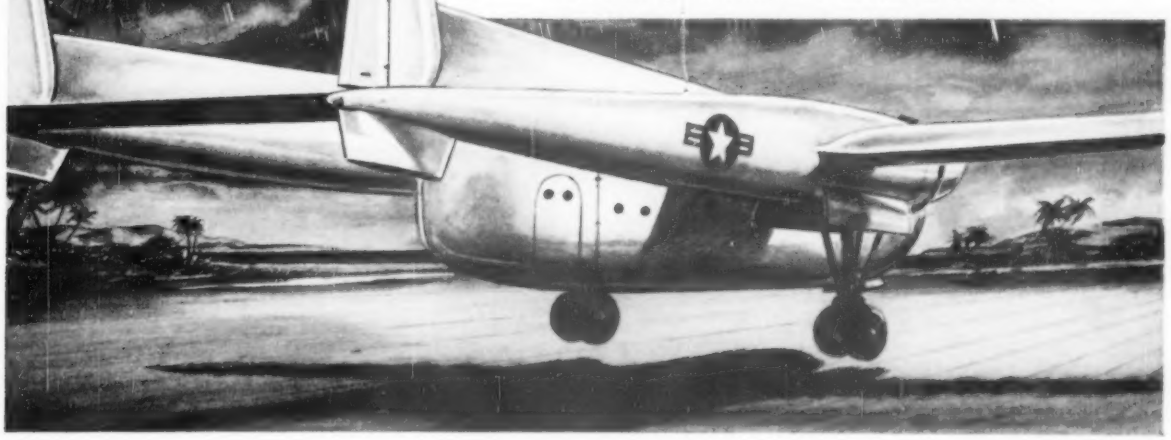
WIRE HARNESS BAND
Non-chafing
Snap-locking Clamp

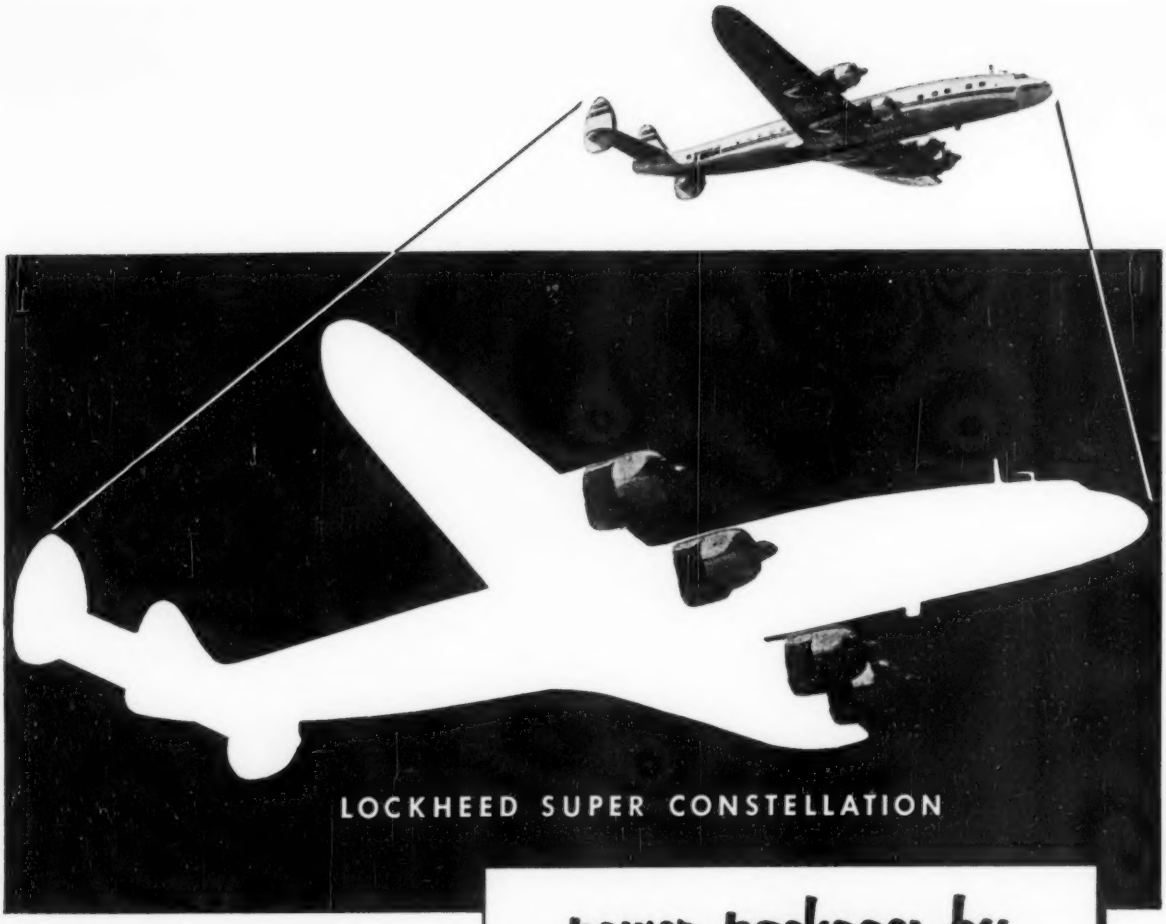
MONADNOCK MILLS



San Leandro, California

Subsidiary of UNITED-CARR FASTENER CORP.





Rohr builds more power packages for airplanes than any other company in the world — and this picture shows the Rohr-built power packages on the wing of the big, beautiful Lockheed Super Constellation. In addition to producing power packages for the world's leading commercial and military planes, Rohr Aircraftsmen are currently making more than 25,000 different parts for all types of aircraft.

power packages by

ROHR

WORLD'S LARGEST PRODUCER OF READY-TO-INSTALL POWER PACKAGES FOR AIRPLANES

ROHR
AIRCRAFT CORPORATION

CHULA VISTA AND RIVERSIDE CALIFORNIA

and operational importance of these common stations present material advantages from the standpoint of conducting operations over the two systems by facilitating the routing of aircraft and the consolidation of duplicating facilities.

"Review of eight mergers, acquisitions and consolidations involving domestic airlines approved by the Board, shows only one instance (the Braniff-Mid-Continent merger) in which the number of common stations equalled the number of common points in the Pioneer-Continental system."

The CAL-PAL integration will provide improved service to 30 cities in Texas, New Mexico and Oklahoma, he reports. Based on proposed schedules, the combination carrier will offer "first new one-carrier service to 25 pairs of cities between which 8,340 passengers travelled in 1952."

Among the principal beneficiaries of new through-plane service would be Austin-El Paso, Tex., Roswell, N. M., and Carlsbad, N. M., and Hobbs-Dallas/Fort Worth, Tex., Continental and Pioneer told the examiner. The New Mexico cities also would be given one-carrier, one-plane service to Houston—their principal port.

▶ **AA Competition**—"The record clearly demonstrates that the proposed acquisition will not materially alter the route structure in the area, create a monopoly or jeopardize other carriers," according to Wrenn. ". . . Integration of Continental and Pioneer will eliminate competition in only four markets, none of which average more than three pasengers per day.

"It would provide a multi-stop competitive service to that of American in the El Paso-Dallas/Ft. Worth market where there is an average of 40 passengers per day and would establish competition in Braniff's San Antonio-Amarillo and Lubbock and Austin-Denver and Colorado Springs markets. The traffic in each of those particular markets averaged less than four passengers per day."

▶ **BNF-CAL Ruling**—Discussing the Braniff-Continental merger possibility, Wrenn holds that:

• Such a merger substantially would reduce the break-even need and total mail pay need, although not enough to render either airline subsidy-free. Bureau counsel estimated that traffic increases resulting from the combined operations and the savings effected through elimination of duplicate costs at common stations would reduce break-even need by $1,436,000. No estimate was made of reduction in total mail pay need.

• Break-even need savings do not include any consideration of costs that might result to the integrated carrier for adversely affected employees.

• Braniff's estimate of a reduction in combined mail pay of $680,422 would not be a net saving to the taxpayer since other airlines would suffer serious diversion of traffic to the integrated system.

It is possible, he says, to arrive at a firm estimate of the diversion that would result since "there is no integrated schedule pattern in the record upon which the other carriers could predicate their estimates."

• Attitude of the parties toward an integration prevents a merger now. Continental is opposed to integration at the present time, "Braniff says that it has some merit and is willing to negotiate, but the testimony of Braniff's president could hardly be described as enthusiastically supporting such an integration," Wrenn reports.

"Moreover, the record shows that Braniff has some financial problems which might have considerable influence on the ability of the parties to agree on the means and terms of payment to the selling carrier," he says.

Wrenn concludes that if the two airlines could agree on terms, there is nothing in such a transaction that "would be inconsistent with and adverse to the public interest."

Combination 377s

Pan American World Airways is converting its entire trans-Pacific fleet of 17 Boeing Stratocruisers to combination aircoach-first class configuration, basing the change on the success of five 377s operating since Apr. 1 on PAA's San Francisco-Honolulu route.

Conversion of a sixth transport this month permitted extension of the service to Tokyo this month. Los Angeles-Tokyo flights will start Aug. 1. Conversion of the entire fleet, will cost approximately $1.7 million.

U.S. Airliners Battle Viscounts in Australia

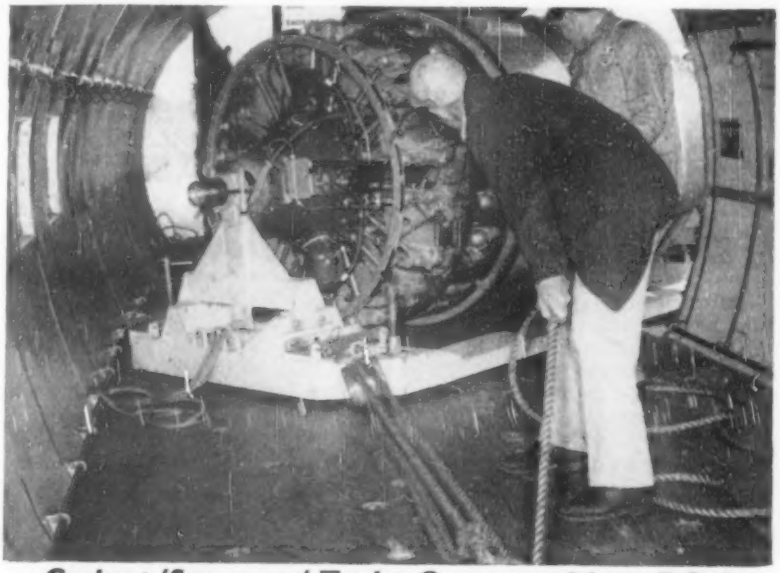
(McGraw-Hill World News)

Melbourne—Australia's domestic airlines are pitting U.S. piston-powered transports against British turboprops in an advertising and public relations battle for increased traffic.

Ansett Airways is booming the merits of two Convair 340s on order; Australian National Airways is pinning its hopes on two Douglas DC-6Bs scheduled for delivery in the first part of 1954, and Trans-Australia Airlines is waging a campaign based on expectation of early delivery of six Viscounts.

Ansett's 52-passenger 340s, sister ships to the airline's already-popular 240s, will be combined with special concessions and lower fares than those charged by ANA and TAA.

Industry observers here predict that Australian National and Trans-Australia will not be able to meet the lower rates because of the cost of new equipment plus wage increases demanded by pilots.



Gadget 'Squeezes' Turbo Compound Into DC-4

Engineers at United Air Lines' San Francisco "push button" base have designed a 3,000-lb. steel engine stand to load Wright R3350 Turbo Compound engines into its DC-4s. A conventional stand will not clear the DC-4's loading door. But retractable casters and screw jacks built into the corners of the new stand allow the device to be lowered for loading, then raised once it is inside for rolling into position. Clearance at the top is less than an inch. Stands are built by Texas Metal & Mfg. Co., Dallas.

U.S. Studies Middle East Airlines

FOA aviation consultants preparing recommendations to bolster West defenses on Iron Curtain borders.

By Richard Balentine

Development of local Middle East airlines to assist in closing the gap in the West's defense perimeter bordering Russia and Red China is being studied by a four-man consulting team of aviation experts working for Foreign Operations Administration.

Headed by Allan F. Bonnalie, director of flight training for United Air Lines and former president and general manager of Lineas Aereas Mexicanos S.A., UAL's Mexican subsidiary, the consultants will provide FOA with recommendations on how to develop properly the small Middle Eastern airlines by giving them:

- Technical assistance.
- Economic aid.
- Mutual security.

As devised by FOA, the airline program is a part of Secretary of State John Foster Dulles' program to seal off the nearly 1,200 mi. of undefended territory between Turkey and Pakistan through which the Russians presumably could invade the West.

Threatened are:

- Suez Canal Zone.
- Vital Persian Gulf oilfields.
- Pakistani airfields at Dalbandin, Pishin and Quetta.
- Important port of Pakistan's capital, Karachi.

It is the Secretary of State's plan to provide these Middle Eastern countries —including Iraq, Iran and Afghanistan —with sufficient aid to bolster their defenses and make them strong individually and collectively to guard the Middle Eastern front. This would establish what is being called the "Dulles Line."

Senate Majority Leader William F. Knowland has said this plan might well become Secretary Dulles' "master stroke in geopolitics."

► **Airline Role**—Limited and often primitive railway and highway facilities in the countries concerned have provided aviation a principle role in recent years in bettering the welfare of the populace. Now that their welfare is so vital to the maintenance of peace within the free world, every effort is being made to strengthen these countries internally.

That's where the local airlines come into the picture.

"Our purpose is to build up these local carriers," says Bonnalie, "for it has been realized that in order to contain communisum we must also build up the standard of living of the people."

► **On the Spot**—Bonnalie's advisory team is working strictly as a consulting group. No funds have been made available for operations. Their work will result only in recommendations to FOA.

Trips to the Middle East will be made eventually, Bonnalie says, in order to obtain on-the-spot information of the foreign airlines concerned. Countries with "most pressing" problems will get first attention.

Effort will be made, he says, to recommend measures that can pay for themselves or be self-supporting in a reasonable period of time. In some cases, U.S. airlines may be called upon to supply financial and advisory aid to the Middle Eastern airlines.

► **CAA Role**—Such action would be similar to Trans World Airlines' move in Ethiopia several years ago when TWA began operation of Ethiopian Airlines. The country gained economically through the effort, and TWA added considerable traffic to its international routes.

Civil Aeronautics Administration also will be considered in the consultant's program since CAA has established and operates aeronautical facilities throughout the Middle East.

"Any government agency whose services may be useful in development of these airlines," Bonnalie says, "will be considered in our recommendations."

A team of CAA international experts returned earlier this year from an investigation tour of the Middle East for FOA (Aviation Week Apr. 26, p. 81). Among their recommendations was modernization of Devlet Hava Yollari (DHY), nationalized Turkish airline.

► **May Extend Work**—FOA's aviation advisory team will deal strictly with the Middle East at the present time but before long their activity may be extended to other points of the globe where a similar situation exists. The assignment is concerned only with the civilian aspect of local transportation, Bonnalie says.

Bonnalie, a retired rear admiral of the Naval Reserve, was selected to head the consulting team by W. A. Patterson, UAL president, when Patterson was asked for assistance by Harold Stassen, Foreign Operations Administrator. FOA wanted an airline expert whose company had no interests in the Middle East.

Assisting Bonnalie are:

- **George R. Cory**, former vice president of American Airlines in Mexico.
- **John T. Milliken**, economist formerly employed by Lansa in Mexico.
- **Byron F. Sherrill**, former chief pilot for Overseas National Airways during the Korean airlift and onetime pilot for China Airways and Pan American World Airways.

Airline Policies Must Lure Investor: Murray

Air transport industry can be subsidy-free and self-reliant only if it is in a position to attract the confidence and support of private investors, Robert Murray, Commerce Undersecretary for Transportation, believes.

"Neither the industry itself nor the policies of government have been successful," says Murray, "until there can be shown a solid record of gain in winning the interest of the private investor."

► **'Something Wrong'**—"Unhappily, the record in this connection leaves much room for improvement," he warns. "We must face the fact that, in general, the man with a dollar to invest does not yet regard the air transport industry as a particularly desirable place for his money.

"As long as the investor remains cool, there is something wrong. The great problem before us in the immediate future is to make sure that the policies of private management and the policies of government will permit enough earnings to win the support of private capital."

► **Policy Framework**—Murray spoke before the annual airlines operations conference at Williamsburg, Va., giving an explanation of the Air Coordinating Committee's air transport policies. He serves as ACC chairman.

The committee's report was accepted recently by President Eisenhower as a "guide in the future consideration of questions related to the subject of civil aviation and in making appropriate recommendations to Congress."

"The report . . . provides a framework of federal aviation policy which is suitably related to the growing maturity of this industry—a policy which will enable the industry to realize fully the type of development required in the public interest," Murray explains.

► **Self-Sufficiency Potential**—With respect to domestic air transport operations, Murray states, ACC has concluded that the industry now is in a position where affirmative steps can be taken to move in an orderly fashion toward a subsidy-free status.

"We are convinced that there is now within the domestic air transport system a basic potential for sustained self-sufficiency, provided that necessary adjustments are made in route structures and in the industry's organization," he says.

Murray believes the goal of self-

26-Cent Mail Rate

Provincetown-Boston Airline has won a three-year star route mail contract from Post Office Department with its offer to transport mail at about half the cost paid the "Big Four" carriers.

The contract calls for payment of two cents a pound on shipments of mail—not only six-cent airmail letters but also three-cent letters, postcards and newspaper individually wrapped—between Boston and Provincetown, a distance of 150 mi.

This is a ton-mile rate of 26 cents, compared with the lowest scheduled airline mail rate, that of the "Big Four," of 45 cents a ton-mile.

Sen. John Kennedy, perennial Capitol Hill critic of airline subsidies, praised the Post Office action: "The Provincetown-Boston Airline will fly the mail at less than half of the company's airfreight rate . . . is not seeking a cent of subsidy.

"To illustrate the example of economy set by this contract, it should be noted in comparison that local service or feeder airlines elsewhere in the country obtain airmail and subsidy pay of six to 20 times their airfreight rates and, under rate orders of the Civil Aeronautics Board, our international airlines receive airmail and subsidy payments of more than four times their freight rates."

sufficiency can be achieved mainly by prompt action by industry and government to effect route modifications, mergers and other adjustments "required to strengthen the industry and give it the fullest possible opportunity for meeting a reasonable schedule for subsidy withdrawal."

In exploring the field of domestic route adjustments, Murray notes that in 1952 there were some 50 airline points that enplaned an average of less than one passenger a day, and about 140 had less than three passengers each day.

Murray says some international routes will have to be maintained for broad reasons of national interest "despite the absence of any clear economic justification." ACC policies "particularly favor the elimination of any unnecessary and uneconomic duplication of services between U. S.-flag carriers," he adds.

▶ **Nonsked Policy**—Commenting on the ACC policy toward nonscheduled airlines, Murray says: "Our policies concluded that the general exemption provision of the Civil Aeronautics Act should not be used as the basis for any large-scale departure from the clearly intended requirement for the certification of common carrier services.

"And it goes without saying that there should not be delay in assuring that the terms of the present nonscheduled exemption are observed in those cases where existing authority has been exceeded."

▶ **Policy Dissents**—Meanwhile, ACC's report drew criticism from the two Democratic members of Civil Aeronautics Board, Josh Lee and Joseph Adams. Principal target of the criticism is the ACC policy on mergers of local service carriers.

Adams states: ". . . In the absence of a careful consideration of all the public interest factors—and not subsidy alone—I do not agree that our well-established local air service system should be disrupted or eliminated by announcing . . . that the one factor of cost is to determine whether cities, routes, or entire systems should be transferred from local service to the trunkline service category; and that absent such transfer, true local air service to these cities, routes or local systems will be entirely eliminated."

Lee states: "I cannot subscribe to any statement of policy which, under the guise of effectuating savings in subsidy, proposes to eliminate the local service industry by permitting trunks to absorb the route systems of the local carriers.

"I, too, favor the reduction and elimination of subsidy but am unwilling to concede that the transfer to the trunks of the smaller communities would in the long run result in any beneficial economies to the government. On the contrary, I fear that much we have achieved during the past 10 years in developing a broad base for the air transportation industry would be sacrificed."

CAA Changes Asked In Bill Amendment

Civil Aeronautics Administration would be established as an independent agency under an amendment which has been proposed to a comparatively minor aviation bill.

It was offered by Sen. Herman Welker "to restore to complete independence the agencies charged with the duty and responsibility of administering civil aviation laws and policies with a minimum of reorganization and legislative change."

The measure to which Welker offered the amendment re-defines "airman" in the 1938 Civil Aeronautics Act with the effect that employes of certificated manufacturing and repair stations would not have to be certificated individually.

To Engineers

WHO WANT TO GROW

You can grow with *Stratos*—now developing new air-conditioning systems, pneumatic power turbines, controls and other pneumatic accessories for aircraft and industry. Positions are now being filled for—

RESEARCH ENGINEERS

For investigations and studies in pneumatic refrigeration and very high speed power turbines.

PROJECT ENGINEERS

Several – Intermediate and Junior.

DESIGN ENGINEERS

Seniors and Juniors.

•

Write to R. T. Bartlett, outlining your qualifications for these interesting and challenging positions. Your correspondence will be kept in complete confidence, of course.

Excellent housing available in area. Convenient to New York City. Wonderful recreational facilities. Fine beaches – Fishing, Boating, Golfing.

STRATOS

A Division of Fairchild Engine & Airplane Corporation

•

BAY SHORE, L. I., N. Y.

Manufacturers of air-conditioning equipment and pneumatic accessories for high speed aircraft.

CAB ORDERS

(June 16-22)

AMENDED:

Transocean Air Lines' exemption to operate a roundtrip flight between New York and Beirut, Lebanon, by making Cleveland the point of departure in the U. S.

Former approval of common control by Reed Pigman as president of both American Flyers Airlines Corp., an irregular carrier, and American Flyers, Inc., to add the following officers to an interlocking relationship: A. B. Crockett, vice president of both companies, and V. O. Coggins, director of both companies.

DENIED:

Seaboard & Western Airlines' application to operate two roundtrip flights between New York and Beirut, Lebanon, between June 20 and Oct. 12 for Lebanese pilgrims.

Motions of Delta-C&S Air Lines, Minneapolis-St. Paul Metropolitan Airports Commission, cities of Milwaukee, Wis., and Rochester, Minn., and Braniff Airways to be included with the joint application of Northwest Orient and Eastern Air Lines for through-plane service between Minneapolis-St. Paul and Miami via intermediate points.

CAA - Certificated Helicopters under 400 h.p. have

Franklin

POWER

AIRCOOLED MOTORS, INC. SYRACUSE, N. Y.

Applications of Great Lakes Airlines, Currey Air Transport and U. S. Airlines to carry first-class and other preferential surface mail for the Post Office.

Reconsideration petition of city of Charlotte, N. C., and its chamber of commerce and Greensboro-High Point Airport Authority requesting that Charlotte and Greensboro-High Point be designated midway cities in the additional Southwest-Northeast service case.

Overseas National Airways' application for an exemption from the tariff filing provisions of the Civil Aeronautics Act in order to engage in charter transportation for U. S. armed services without observing tariffs on file with CAB.

APPROVED:

Intercompany agreements between Delta-C&S and Eastern Air Lines and various other air carriers.

Seaboard & Western Airlines operation of one roundtrip flight of Lebanese pilgrims between New York and Beirut, Lebanon, between June 20 and Oct. 5.

GRANTED:

Air Line Pilots Assn.-International, Milwaukee Assn. of Commerce, Capital, Delta-C&S, National and Braniff leave to intervene in the application of Northwest and Eastern to provide through-plane service between Minneapolis-St. Paul and Miami via intermediate points.

Western Air Lines leave to intervene in Pacific Western Airlines' application to perform operations of a casual, occasional or infrequent nature in common carriage into the U. S.

Minneapolis-St. Paul Metropolitan Airports Commission leave to intervene in Eastern-Northwest application for an interchange agreement.

American, Continental, Eastern, Delta-C&S and Pioneer Air Lines, Air Line Pilots Assn., the Postmaster General and several cities and chambers of commerce permission to intervene in Trans-Texas Airways' application for renewal of its temporary certificate.

(June 21-30)

DISMISSED:

Empire Airlines application for certificate of public convenience without prejudice.

Proposals of Curry Air Transport, Ltd., Great Lakes Airlines and Monarch Air Service for family plan fares.

APPROVED:

Intercompany agreements between United Air Lines and West Coast Airlines and various other air carriers.

Agreements between various air carrier members of Air Traffic Conference of America, Independent Military Air Transport Assn., and Aircoach Transport Assn. for extension of military tenders for transportation of military personnel for fiscal year beginning July 1.

Seaboard & Western Airlines application to fly one roundtrip flight between New York and Beirut, Lebanon, departing from New York June 27 and returning on or about Oct. 12.

GRANTED:

National Airlines, Delta-C&S Air Lines,

United Air Lines, American Airlines, Western Air Lines, Capital Airlines, Eastern Air Lines, Continental Air Lines, Trans World Airlines, Northwest Airlines, Braniff Airways, Defense Department, Society of American Florists, Minneapolis-St. Paul Airport Commission, City of Columbus, O., Columbus Chamber of Commerce, commonwealth of Kentucky, Department of Aeronautics, Louisville and Jefferson County Air Board and Louisville Chamber of Commerce, and Postmaster General permission to intervene in the airfreight certificate renewal case.

National Airlines an exemption until Nov. 5 to provide free transportation to a technical employe of Consolidated-Vultee Aircraft Corp. and two from Douglas Aircraft Co. for the purpose of making technical inflight observation of Convair 340 and DC-7 aircraft.

Pioneer Air Lines a temporary exemption to serve Big Spring, Tex.

CERTIFIED:

Proposed Star Route for transportation of airmail to and from Los Angeles or Long Beach, Calif., and Avalon, Calif., and to and from Boston, Mass., and Provincetown, Mass.

ORDERED:

Information contained in a contract of Capitol Airways withheld from public disclosure.

Pacific Northern Airlines to show cause why CAB should not fix its mail rates.

EXTENDED:

Purdue Aeronautics Corp. exemption to operate charter trips for 60 days.

AMENDED:

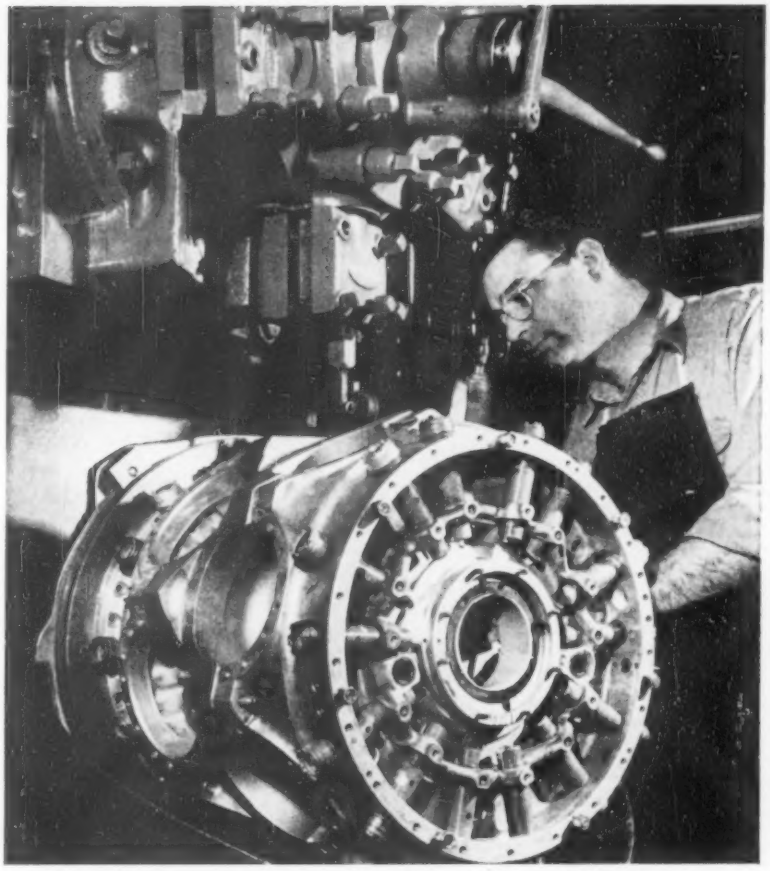
Continental Air Lines exemption by extending it for one year to carry technical personnel of Pratt & Whitney Aircraft, Hamilton Standard, Benndix Aviation, AiResearch Mfg., Sperry Gyroscope, Convair and Douglas Aircraft Co.

SHORTLINES

▶ **Continental Air Lines** reached new traffic highs in June, flying 35,605 passengers 14,277,755 revenue passenger-miles. . . CAL carried 33% more mail during May than in the same month of 1953.

▶ **National Airlines** reports a 200% increase in sales of "piggy bank" package vacations to Florida during the past year, an indication that summer travel to Florida may surpass NAL's winter business.

▶ **Northwest Orient Airlines** has deactivated its refueling base at Shemya Island, 35 mi. from the end of the Aleutian chain, and is operating its trans-Pacific Boeing Stratocruisers and DC-6bs in and out of Thornbrough Airport at Cold Bay, Alaska, 950 mi. east of Shemya on the tip of the Alaska peninsula.



Rematching a new center section to a crankcase, a highly specialized operation.

Factory Tools for Overhaul

ASSURE RESULTS OF
UNIFORM EXCELLENCE

Highly specialized work on Pratt & Whitney Aircraft engines, such as rematching a new crankcase section or rebarreling cylinders, must be done with special machine tools and factory methods. . . . The tools and methods at the Airport Department are assurance that major parts replacements are as excellent as when new, and are properly installed.

Complete Overhaul and Repair Service for
ENGINES and PROPELLERS

AIRPORT DEPARTMENT
Pratt & Whitney Aircraft
DIVISION OF UNITED AIRCRAFT CORPORATION
RENTSCHLER AIRPORT • EAST HARTFORD, CONNECTICUT

News Sidelights

Local service airlines have brought more members of Congress into CAB hearing rooms to support certificate renewals than airline people have seen in some time. There is responsible opinion that this evidence of interest on Capitol Hill has turned the tide in the feeders' favor and that few companies will not have their rights renewed. Some route adjustments and mergers other than the Continental-Pioneer deal (p. 76) are expected, however.

The Washington outlook for scheduled cargo carriers has not improved in recent weeks and there is increasing opinion in well-informed circles that future certificate renewals in this category will be sparse.

Air Coordinating Committee's Civil Air Policy Report still is one of the major aviation subjects of controversy in Washington, although it has been released since May. There still is frequent expression of indignation in Democratic National Committee circles that Commerce Department (or Eisenhower Administration) should feel it has any policy powers over CAB. The Board, Democrats contend, is a quasi-judicial agency, a creature of Congress, and when Congress wishes CAB to change its ways Congress will change the Civil Aeronautics Act.

The ACC's report is expected to have more effect on international airline cases than domestically, since such decisions must be cleared with the White House before they are released and the President can order changes along the lines of Administration policy.

United Air Lines has released nine more DC-6s for conversion to aircoach services, made possible by additional deliveries of DC-7s. President Patterson says as of Apr. 30 United was operating 25% of its mileage as coach, against American's 18% and TWA's 48%. UAL will expand this figure to 37% in the next few months. Many of United's DC-3s are for sale; DC-4s will be used in coach work "as long as there is a demand for them," Patterson says.

Some of the highest Washington circles interested in aviation feel that there are too many airlines in Alaska and further action over coming months to cut the number of carriers there should not be unexpected.

Cities that have been granted aircoach service by the scheduled carriers have generated bigger increases in first-class traffic than cities without scheduled tourist service, one economic study reveals. If true, this result would seem to give the lie to those who say that coach is diverting considerable first-class business.

A Boeing executive told a Los Angeles audience last week that the F-99 is "not in production yet."

First operational unit of F-100s activated will be at George AFB, Calif.

Helicopter shuttle service will be available between the Atomic Energy Commission's Oak Ridge, Tenn., facility and Knoxville Airport, for travelers on official business beginning Aug. 15. Using a Sikorsky H-19 (S-55) loaned by USAF, the new AEC service will save about one hour in travel time between the two points. More than 1,000 passengers a month use Knoxville Airport on official AEC business.

More than 325 flights have been made by Allison Division's turboprop-powered Convair 240, which has two 2,925-hp. T38s and Aeroproducts props. Recently, Assistant Secretary of the Air Force Roger Lewis and his party flew in the turboprop 240 from Allison to St. Louis, the next stop on their nationwide tour.

French recently got two new military planes off on first flight: a two-place Nord 3.201 trainer and the Max Holste 1521 which differs from the previous version in having lower landing gear with low-pressure tires and larger wing flaps. The Nord is a low-wing fixed landing gear-type powered by a 170-hp. Sneema engine weighing 2,000 lb. loaded. A second prototype, powered by a 260-hp. Argus engine, is expected to fly soon.

AVIATION CALENDAR

July 27-Aug. 5—21st National Soaring Contest, Elsinore, Calif.

Aug. 1-7—International Astronautical Federation, fifth annual congress, Innsbruck, Austria.

Aug. 7-8—Experimental Aircraft Assn., fourth annual National Air Pageant and second annual fly-in and convention, featuring "home-built" aircraft, sportsplanes, racers and antiques, Milwaukee.

Aug. 9-10—American Society for Quality Control, national conference of Aircraft Technical Committee and first annual Western Regional Conference, U. S. Grant Hotel, San Diego.

Aug. 9-11—Institute of the Aeronautical Sciences, turbine-powered air transportation meeting, Seattle.

Aug. 9-20—California Aviation Education Assn.'s workshop, College of San Mateo, San Mateo, Calif.

Aug. 25-27—Western Electronic Show & Convention (WESCON), sponsored by West Coast Electronics Mfg. Assn. and Institute of Radio Engineers, Ambassador Hotel, Los Angeles.

Sept. 4-6—National Aircraft Show, Dayton, Ohio.

Sept. 7-12—Society of British Aircraft Constructors, 1954 Flying Display, Farnborough, England.

Sept. 8-11—Symposium on propagation, standards and problems of the ionosphere, sponsored by National Bureau of Standards, Central Radio Propagation Laboratory, Boulder, Colo.

Sept. 13-24—Instrument Society of America, first International Instrument Congress and Exposition and third annual Analytical Instrument Clinic, Philadelphia.

Sept. 19-21—International Northwest Aviation Council, 18th annual convention, Hotel Vancouver, Vancouver, B. C.

Sept. 21-23—Society for Experimental Stress Analysis, annual meeting and exhibition, Bellevue-Stratford Hotel, Philadelphia, Pa.

Sept. 30-Oct. 1—Radio Technical Commission for Aeronautics, fall assembly, Washington, D. C.

Oct. 4-6—Tenth annual National Electronics Conference, Hotel Sherman, Chicago.

Oct. 5-7—Champion Spark Plug Co., 10th annual Aircraft Spark Plug and Ignition Conference, Secor Hotel, Toledo, Ohio.

Oct. 5-9—Society of Automotive Engineers, National Aeronautic Meeting, Aircraft Production Forum and Aircraft Engineering Display, Hotel Statler, Los Angeles.

Oct. 17-22—International Union of Aviation Insurers, annual general meeting, New York.

Oct. 18-22—National Safety Council, Aeronautical Section, Conrad Hilton Hotel, Chicago.

Nov. 8-9—National Aviation Trades Assn., annual convention and meeting, Biltmore Terrace Hotel, Miami Beach, Fla.

Nov. 8-10—Air Industries & Transport Assn. of Canada, annual meeting, Chateau Frontenac, Quebec City.

Nov. 10-12—Industrial Management Society, 18th National Time and Motion Study and Management Clinic, Hotel Sherman, Chicago.

Nov. 12-14—Texas State Aviation Convention, Galveston, Tex.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—JULY 26, 1954

ADEL DIV., GENERAL METALS CORP. 67
Agency—The McCarty Company

ADVANCE ELECTRIC & RELAY CO. 8
Agency—Western Adv. Agency, Inc.

AIRCOOLED MOTORS, INC. 82
Agency—Richards & Webb, Inc.

AIRCRAFT-MARINE PRODUCTS, INC. 60, 61
Agency—Renner Advertisers

ALLISON DIVISION G M CORP. ..... Fourth Cover
Agency—Kudner Agency, Inc.

THE ALPHA CORP. 66
Agency—George F. Walsh Adv.

AMERICAN CHAIN & CABLE, PAGE STEEL & WIRE DIV. 57
Agency—Reincke, Meyer & Finn, Inc.

B. H. AIRCRAFT CO., INC. 52
Agency—Harold Marshall Adv. Co.

BENDIX PRODUCTS DIV., BENDIX AVIATION CORP. 36
Agency—MacManus, John & Adams, Inc.

BRIDGEPORT BRASS CO. ALUMINUM DIV. 29
Agency—Hazard Adv. Co.

CESSNA AIRCRAFT CO. 43
Agency—Gardner Advertising Co.

CITIES SERVICE OIL CO. 27
Agency—Ellington & Co., Inc.

CLIFFORD MFG. CO. 22, 23
Agency—Shattuck & Clifford, Inc.

CLIFTON PRECISION PRODUCTS CORP. 62
Agency—Ivey Adv. Corp.

COM-AIR PRODUCTS, INC. 12
Agency—Phil D. McHugh Co.

CONTINENTAL MOTORS CORP. 26
Agency—The Hopkins Agency

DARNELL CORP., LTD. 8
Agency—Henry L. Rhea Adv.

ELECTRICAL ENGINEERING & MFG. CORP. 32, 33
Agency—West-Marquis, Inc.

ELECTRONIC SPECIALTY CO. 24
Agency—Western Adv. Agency

GARRETT CORP., AIRESEARCH MFG. CO. 5
Agency—J. Walter Thompson Co.

GIANNINI & CO., INC., G. M. 51
Agency—Western Adv. Agency, Inc.

GOODRICH CO., B. F. 21
Agency—Batten, Barton, Durstine & Osborn, Inc.

HAMILTON STANDARD DIV., UNITED AIRCRAFT CORP. 11
Agency—Lennen & Newell, Inc.

HARVEY MACHINE CO. ..... Third Cover
Agency—Hixson & Jorgensen, Inc.

A. W. HECKER CO. 47
Agency—H. Grider Adv. Inc.

HI-SHEAR RIVET TOOL CO. 49

INDIANA GEAR WORKS 66
Agency—Bozell & Jacobs Adv.

JAMES-POND-CLARK 68
Agency—Anderson-McConnell Adv. Agency

KAMAN AIRCRAFT CORP. 39
Agency—Charles Palm & Co.

KAYNAR COMPANY ..... Second Cover
Agency—J. M. Straus & Co.

LABORATORY FOR ELECTRONICS 31
Agency—Harold Cabot & Co., Inc.

LINK AVIATION, INC. 56
Agency—Gaynor & Co., Inc.

LOCKHEED AIRCRAFT CORP. 85
Agency—Donahue & Coe, Inc.

MARQUARDT AIRCRAFT CO. 34
Agency—Heintz & Co., Inc.

MINNEAPOLIS-HONEYWELL REGULATOR CO. ..... Front Cover
Agency—Foote, Cone & Belding

MONADNOCK MILLS, UNITED CARR FASTENER CORP. 77
Agency—H. B. Humphrey, Alley & Richards, Inc.

NOPCO CHEMICAL COMPANY 35
Agency—Lewin, Williams & Saylor, Inc.

NUTT SHEL COMPANY 6
Agency—Welsh-Hollander & Coleman Adv.

NYLOK CORPORATION, INC. 28
Agency—Mellor Advertising Agency

ORCHARD INDUSTRIES 53
Agency—Bozell & Jacobs, Inc.

PACIFIC AIRMOTIVE CORP. 59
Agency—Buchanan & Co., Inc.

PACIFIC SCIENTIFIC CO. 37
Agency—Darwin H. Clark Co.

PRATT WHITNEY AIRCRAFT DIV., UNITED AIRCRAFT CORP. 83
Agency—Lennen & Newell, Inc.

RELIANT INDUSTRIES 68
REM-CRU TINTANIUM, INC. 65
Agency—G. M. Basford Co.

RIVERSIDE METAL CO. 48
Agency—Robert S. Kampmann, Jr.

ROBERTSHAW-FULTON CONTROLS CO. 58
Agency—The Griswold-Eshleman Co.

ROEBLING'S SONS CO., JOHN A. 4
Agency—Beatty & Oliver, Inc.

ROHR AIRCRAFT CORP. 78
Agency—Barnes Chase Co.

RYERSON & SON, INC. 42
Agency—Aubrey, Finlay, Marley & Hodgson, Inc.

SCINTILLA MAGNETO DIV., BENDIX AVIATION CORP. 84
Agency—MacManus, John & Adams, Inc.

SEARCHLIGHT SECTION 70, 71, 72, 73, 74, 75

SENSENICH CORP. 49
Agency—Foltz-Wessinger, Inc.

STRATOS DIVISION FAIRCHILD ENGINE & AIRPLANE CORP. 81
Agency—Gaynor & Co., Inc.

THERMAL RESEARCH & ENG. CORP. 64
Agency—Braun & Miller

TWIN COACH CO. 3
Agency—Palm & Patterson, Inc.

VERSON ALL STEEL PRESS CO. 63
Agency—Russell T. Gray Inc.

VICKERS ARMSTRONG CO. 69
Agency—Intam Limited

WARNER DIV., DETROIT HARVESTER CO. 25
Agency—Clark & Bobertz, Inc.

WESTERN AIR LINES, INC. 38
Agency—Buchanan & Co., Inc.

WESTINGHOUSE ELECTRIC CORP. 44, 45
Agency—Fuller & Smith & Ross, Inc.

SEARCHLIGHT SECTION

(Classified Advertising)

H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant 70-74
Selling Opportunities Offered 70
Positions Wanted 74
Selling Opportunities Wanted 74
Employment Agencies 72

SPECIAL SERVICES
To the Industry 70

EDUCATIONAL
Schools 74

PLANES—EQUIPMENT
(Used or Surplus New)
For Sale 74-75

WANTED
Equipment 74

LOCKHEED
AIRCRAFT CORPORATION
is located *only*
8 MILES from
ATLANTA
GEORGIA-

Where You Can Find

. . . 132 Parks and Recreational Areas
. . . 17 Hospitals
. . . 29 Colleges
. . . More than 480 Churches

LOCKHEED
NEEDS
AIRCRAFT ENGINEERS

STRESS
STRUCTURES
DYNAMICS • WEIGHTS
DESIGN • LIAISON
• PRODUCTION LIAISON •
• SERVICE MANUALS •
• PRODUCTION DESIGN •
• RESEARCH •
• ENGINEERING DRAWING CHECKING •

Here at Lockheed, in Marietta, Georgia, a long range program of production of B-47 Jet Bombers and C-130 A Turbo Prop Cargo planes, plus a new modification contract on B-47 Jet Bombers in service, lets you get in on the ground floor where opportunities abound. Atlanta and Marietta provide excellent living conditions as to climate, cultural, educational, and recreational advantages —and Lockheed is a name that means progress, quality and stability in the business world. Come to the *financially Sound South!*

WRITE DEPT. AW74
LOCKHEED AIRCRAFT CORP.
761½ Peachtree St., NE
Atlanta, Georgia

and tell us where we can contact you with further information.

LOCKHEED
AIRCRAFT CORPORATION

Look to Lockheed for Leadership

GEORGIA DIVISION
MARIETTA, GEORGIA

EDITORIAL

Wipe Out the Blind Spots!

A kid stepped unnoticed into a private plane at an important metropolitan airport, parrotted the routine radio patter for clearance and took off. Fortunately, he hopped safely over a congested building area before he crash-landed. No one died. After the act, the federal officers from Civil Aeronautics Administration moved in fast! It turned out the youthful pilot had no credentials, and never had possessed any.

A pilot of a twin-engine charter carrier's transport started a takeoff at a New York airport with about 15 passengers one night not long ago. Something happened and the takeoff was aborted. A sharp swerve kept the ship from rolling over the seawall. Not many minutes later the pilot tried it again, and there was trouble again. The pilot groundlooped his ship. The right brake caught fire and the plane wound up in an area that had been vacated a few minutes earlier by several gasoline trucks. The airport fire department extinguished the blaze and the pilot elected to try it again. This time he made it safely—out over the crowded residential district adjoining the airfield.

'After Hours'

In the meantime, an airport executive had been trying to locate a CAA inspector. It was "after hours," and the night before a holiday week-end. CAA men were exceedingly hard to find. One finally was contacted and the incident was reported in the hope that the pilot at least would be met in Chicago and compelled to make a full report on the matter—if he got that far.

These incidents are not as unusual as some of us in aviation would like. And if either plane had plowed into streets, homes, apartments or stores with loss of life to citizens, do you think the public would have understood why either of these men was permitted to take off?

Aviation has grown at a phenomenal rate. There are bound to be blank spots technically, operationally, legally, procedurewise. There also are blind spots in our thinking. We are so accustomed to the status quo that we sometimes appear incapable of detecting these blank spots, or realizing the potential penalties we may incur if we fail to correct them.

We should be searching for these blind spots every hour of every day, and taking prompt remedial action when we find them.

Encouraging as our progress in safety has been in many respects, there still appears to be a singular lack of interest in some of these blind spots—an inexplicable lack of awareness of the dangers involved.

Remember Public Opinion

Newark Airport was forced to close down for weeks because of an outraged public opinion following three air crashes in that populated vicinity. Such a drastic measure never had occurred before in aviation history.

But the precedent has been set and who would be brash enough to deny that it can happen again in the same congested area or another?

One of these important blind spots is the complete lack of any official screening of non-airline pilots before takeoff. Airline pilots are supervised carefully. But at most fields there is little done to prevent anyone, pilot or not, from entering the first plane he can, calling for clearances, and starting a takeoff. A tower seldom denies takeoff approval for reasons other than traffic; orders are orders.

The public has a right to legal and adequate protection from irresponsible actions of those who fly. On the books, provision is there for enforcement. But enforcement of these types of infractions is seldom preventive. It usually follows completion of the violation—if anyone remains alive to be punished.

Who and what machinery are set up to make any effort to keep the irresponsible or unqualified pilot from taking off on what is obviously foolhardy or dangerous flight? Certainly, no airtight system would prevent all accidents, but some screening system would be far superior to none at all, and the well-publicized knowledge that a federal officer was on duty at every sizable airport every hour of the 24 would in itself be a deterrent to foolish attempts.

A Dangerous Gap

There is a dangerous gap between the official administration of responsibilities of airport management on one hand and those of the government on the other, and this gap needs closing.

There was no one at the airport that night to check in the charter pilot before he boarded his transport for his three takeoffs for Chicago. Was he a licensed pilot and was he carrying his necessary credentials? Was the certificate his own? Was it still in effect? Did it permit him to operate this class of aircraft? No one knew before he took off. You can repeat this situation hundreds of times a day in this country at busy commercial airports—for most non-airline flights. Yet we take it for granted. It is time to change our nonchalant attitude.

Civil Aeronautics Administration inspectors, the public's protectors, are stationed at most major airports. But for only eight hours a day, from 8:30 to 5, with a half hour off for lunch, 40 hours a week. They are off duty on Saturdays and Sundays! Why shouldn't any indignant citizen take a dim view of such a setup—unless all aviation were closed down at 5 P. M. each day, and all day Saturdays and Sundays.

What kind of public protection is it that permits any Tom, Dick and Harry to board any plane he can get into, at virtually any civil airport in the country, and with the use of the proper bit of radio jargon take off without the slightest difficulty?

We in aviation need to grow in social awareness to the point where we become aghast at the chances we have been taking. We should become exceedingly jealous of the importance of our role in protecting the public, on the ground as in the air. —Robert H. Wood

from helicopters to helmets . . .

Harvey aluminum extrusions will cut your costs

Whether your application calls for an extrusion small enough for the visor of a safety helmet or rugged enough for the main structural member of a helicopter, you can be sure your requirements will be filled to your complete satisfaction at Harvey Aluminum. For more than 40 years we have devoted ourselves to our customers' difficult product design problems. As a result we've built a reputation for bringing a high percentage of their toughest projects to completion. If you need help in product design, engineering or fabrication matters involving wrought aluminum alloys, get in touch with a Harvey field engineer today.

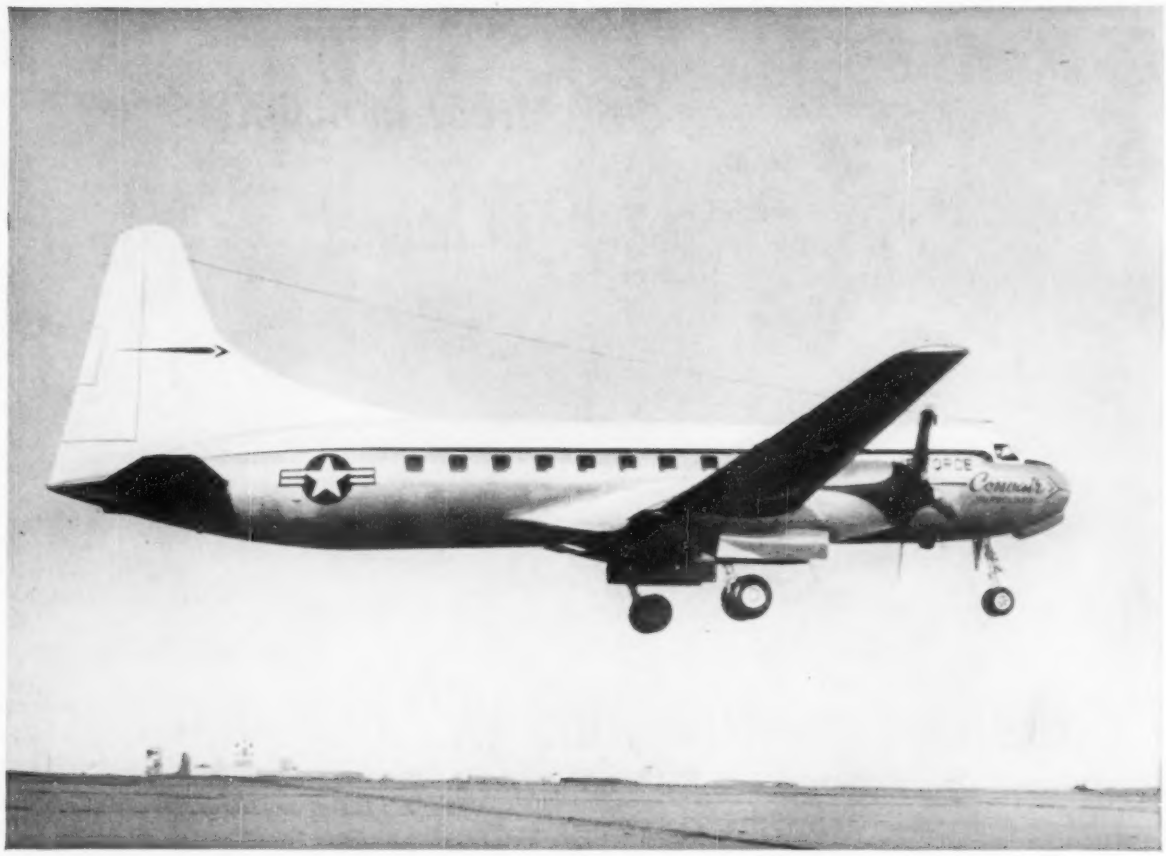
MAKING THE MOST OF ALUMINUM . . . FOR EVERYONE

HARVEY Aluminum

HARVEY ALUMINUM SALES, INC.
TORRANCE—LOS ANGELES, CALIFORNIA
BRANCH OFFICES IN PRINCIPAL CITIES

The men of Harvey Aluminum are dedicated to the idea of improving your product while reducing your costs. And remember, we prepay the freight to your plant.

An independent facility producing special extrusions, pressure forgings, bar stock, forging stock, tubing, impact extrusions, aluminum screw machine products and related mill products.



THE AIRFRAME'S THE SAME —THE POWER'S TURBO-PROP

Here is the Convair YC-131C Military Transport, a conversion to Allison Turbo-Prop power of the Model 340 Convair-Liner. Modified under an Air Force contract, the YC-131C is now flying powered by two Allison YT56 Turbo-Prop engines driving Aeroproducts propellers.

With this installation the Air Force is leading the way in testing the practical operating usefulness of Turbo-Prop engines—paving the way for the change from reciprocating to Turbo-Prop engines in transport and logistic aircraft.

Allison Turbo-Prop design and performance characteristics can help today's transports meet tomorrow's advanced operational requirements of:

- **Increased Payloads**
- **Higher Cruising Speeds**
- **Lower Fuel Cost**
- **Less Maintenance Time and Cost**
- **Shorter Take-offs and Landings**
- **Greater Passenger Comfort**
- **Reduced Ground Handling Time**
- **Reduced Crew Fatigue**

Since December 1950, Allison has conducted extensive flight tests with its own Turbo-Liner to exploit the advantages inherent in Turbo-Prop power for transport service. In addition, the Navy is accumulating experience in the Douglas A2D Skyshark and the Convair R3Y Tradewind—also powered by Allison Turbo-Prop engines driving Aeroproducts propellers.

Today that pioneering is paying off in the availability of Turbo-Prop engines and propellers which will enable military and commercial aircraft to carry bigger payloads, farther, faster and more economically.

GM
GENERAL MOTORS

Allison
Division of General Motors, Indianapolis, Indiana